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Editorial

Dear authors, reviewers, and readers

It has been a month since I was given the privilege to serve as the Chief Editor of the International Journal for Innovation Education and Research (IJIER). It is a great pleasure for me to shoulder this duty and to welcome you to **THE VOL-3, ISSUE-7 of IJIER** which is scheduled to be published on **31st July 2015.**

International Journal for Innovation Education and Research (IJIER) is an open access, peer-reviewed and refereed multidisciplinary journal which is published by the International Educative Research Foundation and Publisher (IERFP). IJIER aims to promote academic interchange and attempts to sustain a closer cooperation among academics, researchers, policy makers and practitioners from a wide range of disciplines, which contribute to state of the art in science, education, and humanities. It provides a forum for the exchange of information in the fields mentioned above by welcoming original research papers, survey papers, and work-in-progress reports on promising developments, case studies, and best practice papers. The journal will continue to publish high-quality papers and will also ensure that the published papers achieve broad international credibility.

The Chief Editor, appointed by the Associate Editors and the Editorial Board, is in charge for every task for publication and other editorial issues related to the Journal. All submitted manuscripts are first screened by the editorial board. Those papers judged by the editors to be of insufficient general interest or otherwise inappropriate are rejected promptly without external review. Those papers that seem most likely to meet our editorial criteria are sent to experts for formal review, typically to one reviewer, but sometimes more if special advice is needed. The chief editor and the editors then make a decision based on the reviewers' advice.

We wish to encourage more contributions from the scientific community to ensure a continued success of the journal. We also welcome comments and suggestions that could improve the quality of the journal.

 I would like to express my gratitude to all members of the editorial board for their courageous attempt, to authors and readers who have supported the journal and to those who are going to be with us on our journey to the journal to the higher level.

Thanks,
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Construction of interactive Card Game as appliance for the learning in discipline Transport's Systems in Civil Engineering course of Universidade Federal do Paraná

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Abstract

The objective of this research is to present and discuss the results with the inclusion of an educational alternative – Construction of Card Games – in order to enhance students learning in the discipline of Systems Transports in the Civil Engineering course of UFPR, when compared with classes that did not perform the activity. Through this discipline sought to assess if the students would be able, with the proposed approach, of absorb new knowledge and more interesting, without compromising the traditional programmatic content. For this, the decks were made in class times. The results, by the final ratings of discipline, when compared with three other classes in the same discipline, taught by other professors who did not develop the activities, show that this tool contributed in some way to the improvement of the traditional methodology, seen that among the groups showed the highest average compared to others, with positives results for learning.

1. Introduction

The use of new communication and information technologies and pedagogical strategies that value the professional formation has revolutionized various educational segments. The formation of engineers, for example, must be increasingly debated and studied at national level, since there is still little action of organizations concerned with education in engineering.

According to Pereira and da Silva (2009), transport engineer ends up encountering today with the difficult task of not only apply the acquired theoretical knowledge in engineering school, but also to gain knowledge of new techniques, skills and expertise to meet the requirements labor market. Faced with this context, the institutions responsible for engineering education cannot ignore this market trend and need to ensure the the extensive training that the future engineer needs. So, this new form of activity that gets to be required by both the labor market and society, begins to influence the functional engineer potentialities and therefore to be considered in the educational model.

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Based on experiences in Canada and Netherlands, several schools in Brazil have seeking to adopt the PBL (Problem Based Learning) in their curricula. That information has had important repercussions, which according Berbel (1998), can be both positive, by the new ways of teaching and learning, and negative, by the natural resistance to change.

Having as the motivation this need for change in the educational model of engineering courses, this study discusses the inclusion an educational alternative for improvement and adaptation of the teaching-learning process, through a case study using PBL conducted in a civil engineering course in discipline Transport Systems.

2. Objectives

Introduce and discuss the results obtained with the inclusion of an educational alternative – Construction of Playing Cards - in order to improve student learning in the discipline of Transport Systems of UFPR Civil Engineering Course, compared to groups that did not perform the activity.

3. Theoretical Foundations

3.1. Process of Teaching-Learning

Nowadays, more and more information invades the routine of people. The events occur and alter very quickly and, in many cases, imperceptibly. Moreover, according Colenci (2000), the concern and actions toward improving the quality of engineering education have been growing significantly, which has occasioned numerous experts to seek new strategies for the educational process.

One aspect that leads to the search for a new model for teaching and learning is the remarkable disparity between teaching and practicing the present stage of technological development characterized by real market demand for qualified professionals. The challenge in terms of quality of engineering education is based on seeking a new model that incorporates the technological and social changes and offer alternatives that enhance the teaching-learning process.

Given this, some educational institutions in different countries are modifying teaching methods in their degree programs in Civil Engineering as incorporating new techniques into their educational systems. This applies, for example, Purdue University (Eidson and Bullock, 2001) and the University of Iowa (Nixon, 2000), who have been using online videos, web pages and other forms of media as tools for research in MacMaster and Masstricht (Berbel, 1998), adopt the Problem-Based Learning in their curricula, among many other authors. The main difficulties of learning, are directly related to the teacher-student relationship. In the teaching-learning process interest, both the teacher and the student, should be common.

Until relatively recent past it was possible that they were graduated engineers to work in a little competitive market with technologies that remained in use for a long time. Today, with a globalized labor market, it has become extremely competitive. In parallel, the technologies have been shown with ever shorter life due to advance ever faster computerization (Linsingen et al., 1999 and Lima, 2002). Thus form an engineer with a suitable profile to the times means first of all, give you conditions to realize the changes and be organized quickly a new approach to the teaching-learning process.

Many authors study a new paradigm that prepare future professionals for contemporary professional practice: Gaspareto et al. (1990), Soriano et al. (1992), Leon (1995), Dantas (1993), Ruiz (1994), and Schiefler Beltran (1995), Pereira and Bazzo (1997), Naegeli et al. (1997), Martin Son (1997), Kuri (1998), Ribas et al. (1998), Ribeiro (2000), Lima (2002) and Pereira et al. (2003, 2004 and 2005), cited in Pereira (2005).

A study by Ribeiro (2000) points to the main differences between the new and traditional paradigms of higher education, summarized in Table 1.

Table 1: Relationship of traditional and new approaches to teaching and learning process.
Source: Pereira (2005), adapted from Ribeiro (2000).

PARADIGMS OF HIGHER EDUCATION	
Traditional Approach	**New Approach**
University isolated knowledge center in society	University working in partnership with society
University seen as a city	University seen as an idea
University focused in itself	University focusing on market and society as a whole
Courses of 4-5 years	Continuing education
Teaching in the institution classrooms	Teaching anywhere
Reproduced knowledge	Built knowledge
Learning based on memorization, repetition	Learning based on problem solving (learning to learn)
Fixed academic calendar	Operating year-round. Flexible schedule
Technology as an expense. Little use of technological resources	Technology as a differentiator. Indispensable use to support the teaching-learning process

According Colenci (2000), teachers, in general, follow the scheme chalk and blackboard and students take notes and study for exams. It's the traditional model of existing education to form labor and not a multifunctional professional able to think and act with flexibility and initiative. The student, upon receiving the knowledge ready, does not bother to look for new solutions to existing problems, or even identify new problems and when he entered the labor market, will deal justly with new situations. As for the teachers, even by lack of educational materials in their training, do not use teaching methods that develop in student's new ways of acting and thinking, despite abundant material available. Usually they give lessons on how learned in his student days.

Thus, it can be concluded that the teaching method focused on the teacher, where this brings the ready content and the student merely passively to listen to him, is still widely used in engineering education, but the only application of this model makes the ineffective teaching-learning process. The question is not to label the technique as traditional and reject it as a teaching method. It happens that teachers with traditional attitudes may become an authoritarian class, dull and uninteresting, either expository or not. It is the exception that you are not disqualifying the lecture; only suggests that it is not overused. Thus, the object of study of this research is the PBL - Problem Based Learning.

3.2. Problem Based Learning – PBL and the Educational Games

PBL, according Sakai and Lima (1996) is the main axis of the curriculum theoretical learning some institutions, whose educational philosophy is student-centered learning. It is based on the study of the problems proposed in order to make the learner to study certain content. The authors emphasize that this methodology is training as encourages an active attitude of the student in search of knowledge and not merely informative as is the case with traditional pedagogical practice.

According to Oliveira (2014), identifies which teachers and learners recognize the advantages and even changing requirements as to the form of education through the adoption of more active approaches such as PBL.

There are several possible forms of evaluation into the curriculum based on problems. Define, for example, content parts to be addressed in an integrated way, are defined modes of action to teach, to learn, to manage, etc. The Problem-Based Learning, according Berbel (1998), has a sequence of problems to be studied. At the end of one starts the study of the other. The knowledge gained in each subject is evaluated at the end of each module, based on objective and scientific knowledge.

Sardo and Dal Sasso (2008), for example, used educational games in the Problem-Based Learning which proved to be extremely positive, and this will be the focus of this research.

The game is not only a free activity, but also presents rules and requires the participant's reasoning to solve the problems presented. According to Melo and Lima (2013), the literature shows several educational games in engineering and exact sciences, as studied by Balceiro et al. (2003), and Romanel Freitas (2009; 2011) and Vasconcelos et al. (2012), including Melo and Lima (2013).

Thus, this work proposes the use of educational games, but specifically, the production of TRUNFO® game playing cards as a learning tool, giving students involvement in the design, development and implementation, as well as in their use and acquisition of knowledge, in that you can awaken interest in learning. The topics covered in the cards are the contents of the Transport Systems course offered in the second year of the Civil Engineering course at the Federal University of Parana.

4. Methodology

4.1. Definition of the card decks

The types and the quantity of cards of each deck than would be made was defined in meetings between PET group and discipline's teacher and the cards were based in the subject of the class.

The number of cards of each deck was defined lately, according to the number of lessons available for the making of the cards. So, the following values were defined:

Schedule #2: Number of cards.
Source: Author.

	Highway	Railway	Waterway	Ductway	Airway	Total
Vehicle	3	3	2	-	2	10
Way	3	2	2	2	-	9

These values are referents to the number of card made for each group of students. This way, each deck would have six times those numbers, having in the end 60 cards in the vehicle deck and 54 cards in the way deck.

4.2. Criteria's definition

The criteria of each deck, were defined and based in concepts linked to the subject to improve the learning of the students. Each deck had 4 criteria, being these the followings:

Deck #1 (vehicles):
1. Speed (Full speed of the vehicle, in km/h);
2. Capacity (how many tons the vehicle can transport);
3. Cost (cost of acquisition of the vehicle, in R$);
4. Pollution index (index related to how much pollution the vehicle generates, dimensionless; it will be better explained in the 4.2.1 item.).

Deck #2 (ways):
1. Construction's cost (cost of construction of the way, in R$/km);
2. Maintance's cost (total maintance's cost of the way in an year, in R$/km.year);
3. Extension (total extension of the way, in km);
4. Construction time (total construction time, in years).

4.2.1. Pollution index

For this definition, was established a criterion by the authors, than toke in consideration the vehicle's fuel, the consumption per kilometer and the vehicle's capacity. By this way, was made this equation:

$$I = \frac{K * l/km}{C}$$

Been:

I = Pollution index;
l/km = vehicle's consumption in liters per kilometer;
C = Vehicle's capacity, in tons;
K = Fuel's coefficient.

The values of K were definite in function of the fuel, been bigger for more pollutant and smaller for less pollutant fuel.

Schedule #3: Values of K
Source: Author.

Fuel	Gasoline	Alcohol	Diesel Oil	Natural Gas	Mineral Oil
K	3000	2000	4000	1000	2500

The values of K are in 10^3 order for the last values of Pollution index be, mostly, between 1 and 100.

4.3. Making of the cards

For the making of the card, two layouts were made, one for each deck, to be used like templates by the students.

Picture #1: Templates of the vehicle's and way's cards, respectively.
Source: Author.
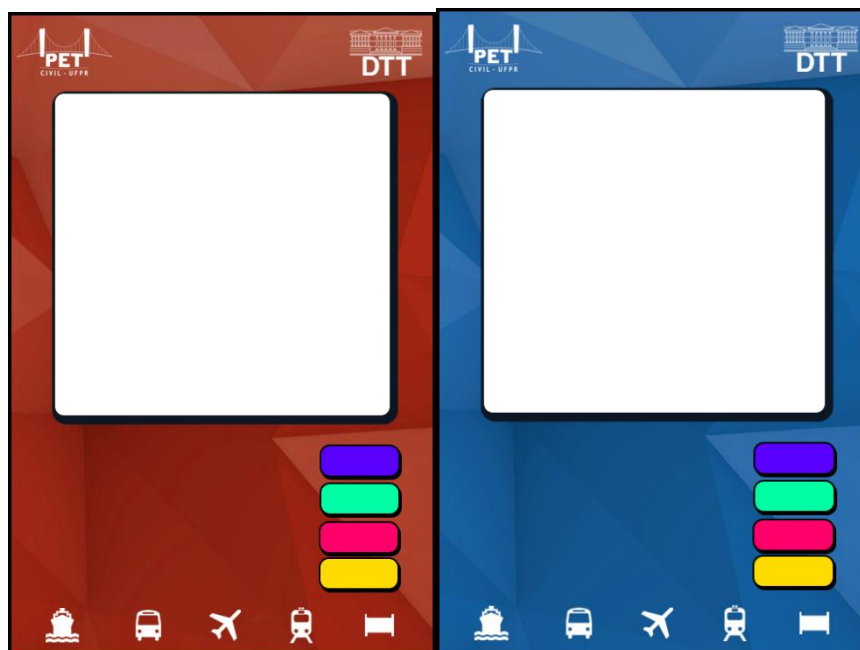
For the students could make the cards in a easy way, didn,t needing to download any software, was used the free software Pixlr Editor®, from Autodesk© , than can be used online from the link http://apps.pixlr.com/editor/. In this software, the layout of the cards was made, with the editable texts and the transparent background, for be inputted the picture of the way or corresponding vehicle. Previously of the first making of the cards, a tutorial was given a quick tutorial of the made process of the cards, teaching the students how to edit texts and pictures on the software.

Picture #2: Template with texts in the site.
Source: Author.
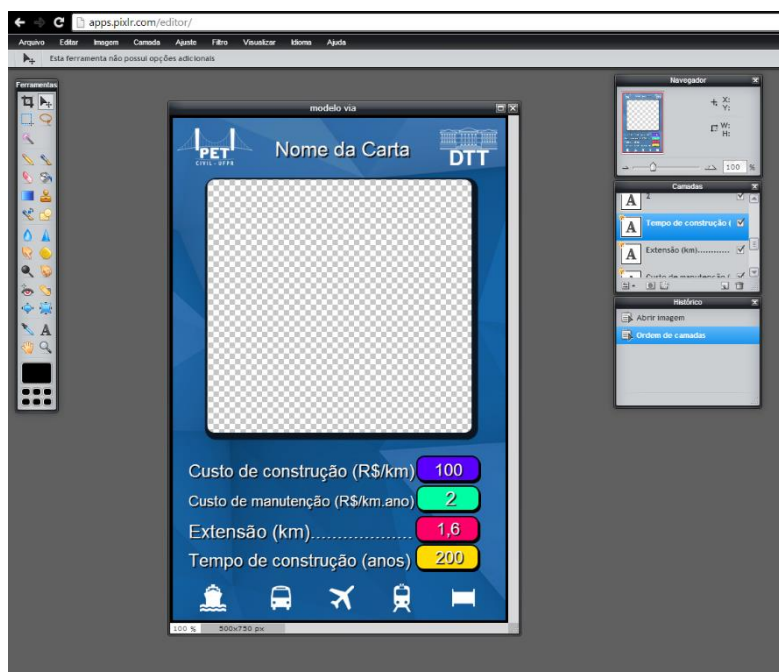
4.3. Application in lessons

Firstly, an introduction lesson was made by the students of PET Civil UFPR (Tutorial Education Program, acronym in Portuguese) of how the card will be made, what were the objectives, what would be the decks, the criteria of each deck and answer any question about the project. This done, each one of the three PET's students was defined tutors of two students' groups, to help during the making of the cards.

In the end of each subject of the class, one lesson was given to make the cards. This cards were made in this order: highway vehicle, highway way, railway vehicle, railway way, waterway vehicle, waterway way, ductway way, airway vehicle. For each day, a previously search was made for the teacher and PET students to help the class students during the making of the activity.

The pictures #3 and #4 show examples of results from some cards made by the groups of the class.

Picture #3: Examples of the vehicles' cards.
Source: Author.

Picture #4: Examples of ways' cards.
Source: Author.

5. Results

The theme has four classes at the same time whit four different teachers, so it was possible to make a balance between the grades of the class when the method of construction of the cards was applied and the other ones.

Schedule #4: Classes grades average
Source: www.dtt.ufpr.br.

Class	Aplied class	Class X	Class Y	Class Z
Média	**78,1**	64,7	64,8	60,1

It is noticed than, in the class where the method was applied, the average of the grades was 20,7% bigger than in class X, 20,5% bigger than class Y e 30% bigger than class Z, having an medium increase of 23,7% in relation of the other classes grade's average, representing an significant increase in the grades.

It is noticed to than the insertion of the educative game, in this case, construction of the card deck, interleaved with the expository lessons of the subject in study, which has particulars to be exclusively theoretical, at least encouraged the students during the semester. It can be watched, by the results, an upgrading in the process of teaching-learning, so mixing the traditional and the innovative teaching methods.

For futures results, will be realized activities with kids of elementary school using the interative card decks, inside the project "*InterPET nas Escolas*" (InterPET in schools), from PET Civil group, which has an objective of present civil engineer to the children. The objective of the card decks is to be used like a card game, which each child has a part of the card deck, equally divided, and plays against other children card by card, each one choosing an attribute and looking whose has the best value.

6. Conclusion

Because of the great development of the communication and information networks, the process of globalization had a big impulse. With that, there was the necessity of redefine the profile and the activities of the professionals, generally, and of the engineer, particularly in this research.

Therefore, this research explored and evaluated an educational alternative (PBL) through the insertion of the construction of the card deck in a theme of the fourth period of the curse of civil engineering, which shows an exclusively theoretical feature, where the traditional methodology adhered at lectures.

In this way, was founded the challenge of avaluate if the students would be capable of made the cards during the lessons time, without interfere at the curriculum. This made they learned subjects and information off the lectures.

From the results lately showed, there is signs than the innovative methodology used in classroom upgraded the learning of the theme, even don't having real evidence about that. That occurred for the input in the traditional teaching method of the natural practices from PBL, like pro-activity and team work. Therefore, the students could take the knowledge from a more active way, besides strong characters relativities with the interpersonal relations and the sharing of knowledge.

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Holiday Arrangements of Domestic Tourists in Kyrgyzstan: Sample of Bishkek City

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Abstract

In our days, just as tourism industry has the same importance in world economy as oil and automobile industry, tourism sector also has a good potential for Kyrgyzstan. However, all tourism activities are for foreign tourists coming to our country, so domestic tourism and domestic tourists are ignored. For the development of the tourism sector in every respect, both international and domestic tourists holiday arrangements must be taken into account. In order to identify holiday arrangements of the country's domestic tourists and the types of holiday they prefer and to determine the famous destinations of domestic tourists, 100 domestic tourists were chosen by random selection method for a questionnaire.

1. Introduction

In the last years, the scope, value and context of international tourism and domestic tourism have transformed at a certain level. Economic benefits such as employment, foreign exchange inflow, income and taxes that are formed by domestic tourism and international tourism (Nowak et al., 2003) make the developed and developing countries dependent on tourism and incite them to realize every kind of development programs (Heidarabadi, 2008).

In many countries of the world, tourism is a sector which develops dynamically, and its role in the world economy constantly increases. Although tourism sector only has 7 % share of the world capital, its total endorsement comes just after the oil and automobile endorsement. The tourism budget involves about four trillion USD dollars in the world, and the tourism sector forms the main item in the budget of countries. International tourism is the most labour-intensive sector of the world economy. Today, one out of ever ten people works in the tourism sector (Драчева, 2010, 568). Tourism, in most of the developing countries, thanks to its characteristic of gaining foreign exchange, attracts attention as one of the most effective alternatives in financing the foreign trade and the industry (Yarcan, 1994).

It is known that there is a common view that has formed about domestic tourism. Domestic tourism doesn't bring foreign exchange as much as international tourism and it is very sensitive to domestic pricing, therefore the attraction of domestic tourism doesn't become appealing in this regard (Mendiretta, 2011). Namely, given domestic tourists, we should change our views which we utilize while looking at foreign tourists coming from abroad. The development of the country tourism depends on the development of domestic tourism as well as increasing the number of foreign tourists coming to the country. The domestic tourism trends form the industry's development dynamics. Success can not be expected from the countries which don't present holiday opportunity to its citizens within the country and don't meet holiday requirement of them. The presence and potential of the domestic tourism demand and the realization of the demand decrease the dependence of the tourism industry on foreign markets and firms, and provide assurance for healthy development and independence of the tourism industry (Gökdeniz, 2004)

The tourism industry is one of the fast developing and leading sectors of the economy of our country. Moreover, it is clear that the tourism sector may be a good alternative for Kyrgyzstan which hasn't got a developed production sector as in Japan, China or the USA. The tourism sector develops day by day. This development enlarges with the increase in the number of the accommodation companies and of the education centres giving tourism education. In addition, with supports given by various associations of the country, the development of tourism is aimed. For example, according to the information given by the National Statistics Committee, while the total 160 accommodation companies were working in 2011, this number was exceeding 190 in 2012. It's evident that Kyrgyzstan cannot completely use the tourism potential though it has got a certain development dynamic (SIAR research & consulting, 2012).

We can say that less work has been made for domestic tourism in forming the tourism policy carried out in our country. On the other side, it must be remembered that domestic tourism is underdeveloped is connected to cultural, social and political properties of the country as well.

2. Literature Review

According to the "Recommendations for Tourism Statistics" published in 1994 by the USA, tourism is generally classified as inbound (incoming foreign tourists) tourism, outbound (the country sends tourists to other countries) tourism and domestic tourism (http://ianbek.kg/?p=1128).

Domestic tourism includes the tourism actions made inside the boundaries of a country or inside a certain region. Why domestic tourism is prevalent in almost all countries of the world is that the preparation of visa operations is not necessary within the country.

The domestic tourism volume differs from country to country. The size of the country, the availability of unique touristic destinations within the country, the availability of historical places and the arrangements of the State make big impact on this difference (Александрова, 2002).The advertising activities carried out in the country, the availability of laws encouraging domestic tourists to travel inside the country and the support programs towards enterprises for domestic tourists affect the volume of domestic tourism.

The tourism researchers have recently started to develop the domestic tourism phenomenon especially in the developing countries (Scheyvens, 2002, Rogerson and Zoleka). Moreover, in the global economic crisis in the year 2008, when tourists preferred making holiday inside the country to holiday abroad, that domestic tourism is an important sector was proven once more (Доолотбекова, 2011).

According to the State Project the tourism development program until 2017 made by Department of Tourism the problems of the tourism sector in Kyrgyzstan are summarized below (deptourism.gov.kg/departamentom).

• After 2010, in tourism market of Kyrgyzstan, with respect to the number of visitors to Kyrgyzstan, Kazakhstan and Russia take the first two places, and Uzbekistan comes after them as the third. In the summer season of the year 2013, it was seen that the flow of Kazakhstani tourists forming the basic tourist flow of the summer term decreased. This event depends on that Kazakhstan carries out operations to turn its domestic tourists into its own domestic tourism destinations by using every kind of administrative-technical sets and also on information campaign it carried out to decrease the competitive power of Kyrgyz tourism. Russian Federation has been making important works to develop its own new touristic regions such as "Golden ring" and "Green ring". This leads to Kyrgyz tourism to lose its tourists coming from these countries.

• The touristic activity of neighboring countries reveals the threat of decreasing the flow of tourists who will come to Kyrgyzstan. Political and social events in other countries directly affect the formation of the image of Kyrgyzstan and its touristic attractiveness.

• Effective works have not been performed for Kyrgyzstan to gain new tourism markets since the beginning of the independence period. Due to the inadequacy of the State budget, advertising activities for introducing Kyrgyzstan as a touristic destination outside the country boundaries can not be made commercially.

• At the present day, negative information about Kyrgyzstan is available in terms of the internet connections. This shows Kyrgyzstan as unstable and dangerous country from the viewpoint of other countries.

• That it is geographically placed far from counties producing tourists, that transportation and communication are underdeveloped, that it hasn't got its own airport and that it has high costs of transportation in arranging the tour packages prevent the tourism sector from actively developing.

• The inadequacy of the middle class accommodation companies, the lack of the service enterprises along the road (motel, food and drink enterprises, public areas and road signs) and the incompetency of the specialization accommodation companies for people who like adventure and the inadequacy in tourism and of sport and entertainment mega-centres and transportation tools create complexity in the development of tourism.

• Underdevelopment of the tourism infrastructure in regions. The large part of them is not in satisfactory level. The quality of services cannot respond to the desired price and to the demanded standards.

• The problems mentioned above are not only one of the tourism sector. By eliminating these problems and changing our weak sides to the strong way, to develop the tourism sector in our country is possible.

Importance of Domestic Tourism for Kyrgyzstan

As we mentioned above, the efforts of neighbouring countries, which form the main tourist flow of Kyrgyzstan, to develop their domestic tourism cause the tourist flow to our country to greatly decrease.

Even if domestic tourism can't give significant flow of foreign exchange as much as the inbound tourism, it presents many advantages like the facility of forming new business places, the development of the general infrastructure, the development of rural regions, the increase in taxes due to economic activity and the chance of native population to arrive in new and interesting destinations.

If foreign tourists are to choose the types of "home holiday" as in global economic crisis in 2008, the tourism enterprises in our country will be obliged to look for new market. Hereby domestic tourists will form new market for the tourism enterprises. Another way of developing domestic tourism is to provide the importance of tourism to be understood among native population, to provide them to understand that Kyrgyzstan is a beautiful destination and to be proud of their country.

3. Methodology and Model

In this study, by taking the importance of the tourism sector for Kyrgyzstan into consideration, we will try to determine the holiday habits of domestic tourists and to show the development dynamics of domestic tourism. In addition, it is aimed to explain changes in requests of domestic tourists and to make some recommendations to enterprises serving in the tourism sector. The research is in descriptive model. The subject matter of the research is the potential tourists of Kyrgyzstan. The questionnaire was applied to 100 potential tourists selected with the convenience sampling method. In the research, tendencies of people living in the city of Bishkek towards holiday arrangements were tried to be determined by applying the data set composed of 18 questions and getting primary data.

4. Findings

It turned out that the 32 % of respondents meeting the questionnaire were male and 68 % of them female. If we take demographical situation in the country into account, this information is not surprising.
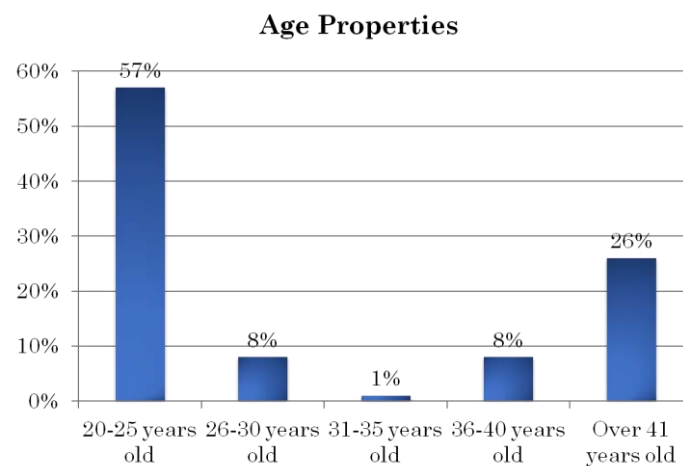
Age Properties

1ˢᵗ Graphic: Age properties of respondents
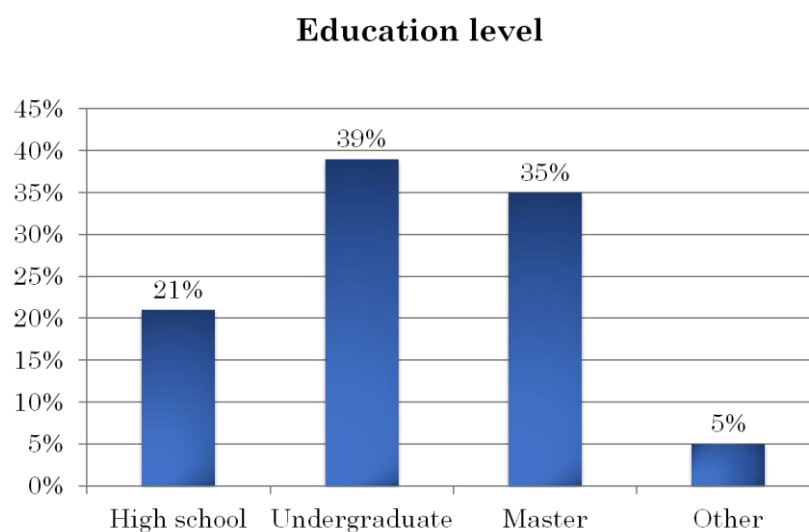
Education level

2ⁿᵈ Graphic: Education level of respondents

We can see that 35 % and 39 % of those attending the questionnaire are respondents who have undergraduate and master degree. This information shows that the citizens of the country have high education level. This situation greatly affects the travelling habits and travelling properties. In addition, we can see that the large part of the respondents is the young. In terms of tourism, we can say that this situation leads to new travelling and the development of holiday making habits and especially the potential of increasing the level of service in tourism sector.

Occupation distribution
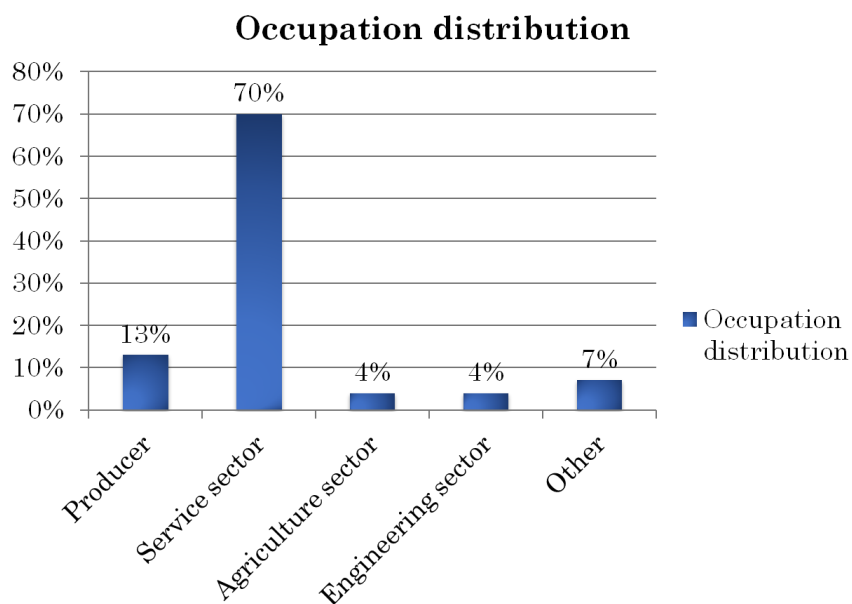
3ʳᵈ Graphic: Occupation distribution of respondents

It is apparent for everybody that the agriculture and animal feeding sector is superior in Kyrgyzstan. However, it's seen that most of attendants of the questionnaire are those working in service sector. This situation can be explained with that the city-dwellers have mostly attended the questionnaire.
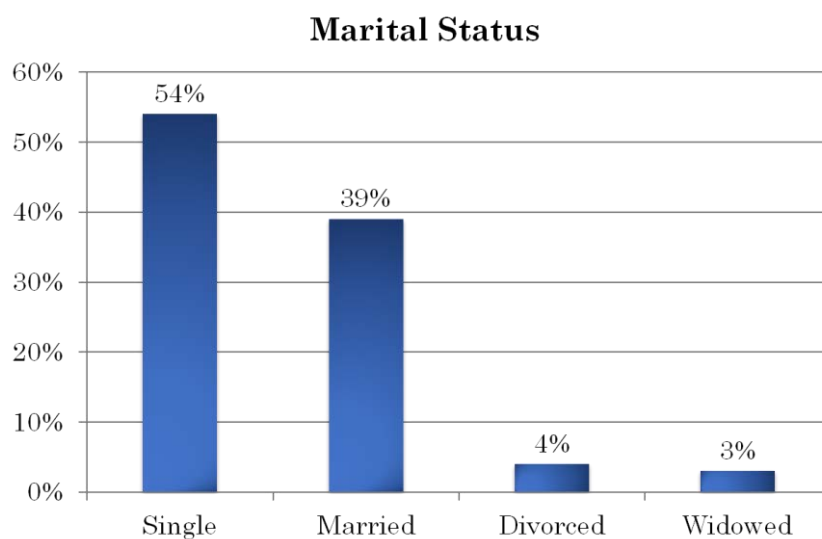
Marital Status

4ᵗʰ Graphic: Marital statuses of Respondents

How many times do you take holiday?
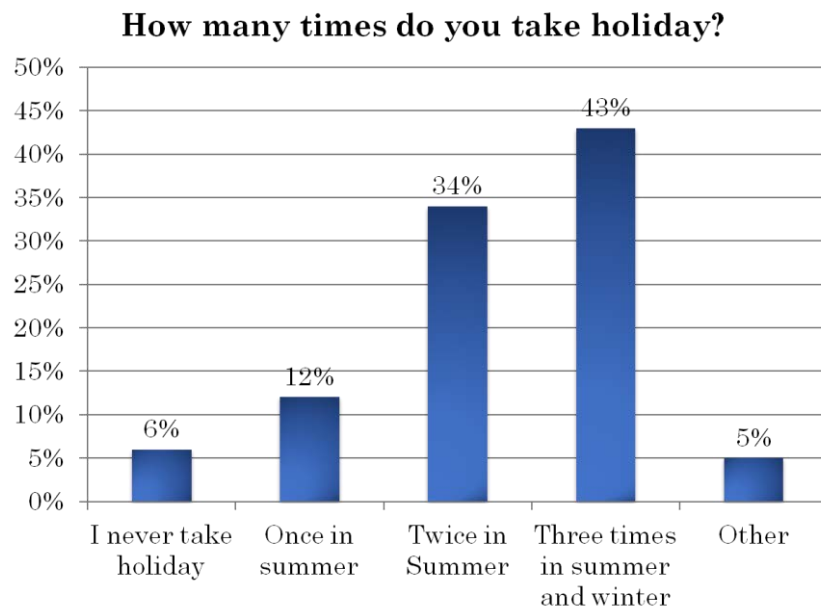
5th Graphic: How many times do domestic tourists take holiday in a year?

Distribution of Holiday according to months
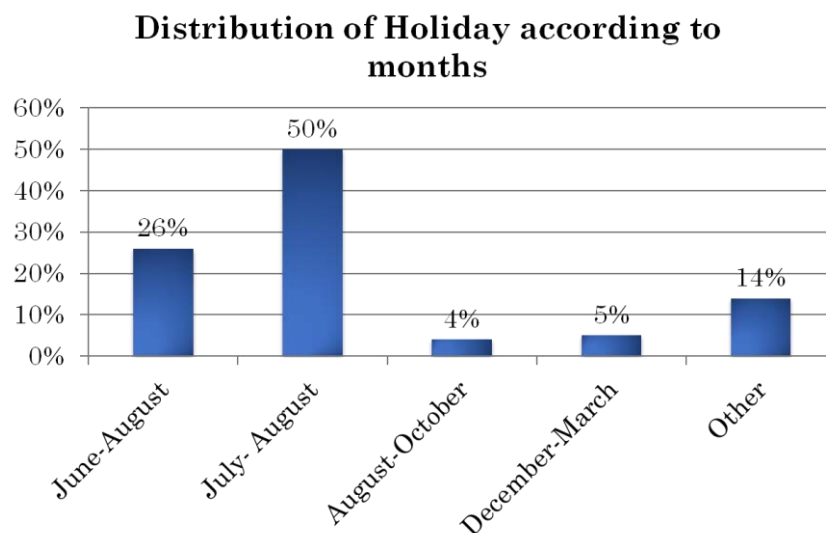
6th Graphic: Distribution of holiday according to months

A great majority of respondents have stated that they take holiday in the summer. This situation can be explained with that all schools and universities take holiday in the summer. As seen below, since the family vacation is adopted in our country, the elder members of the family try to arrange holiday when children take holiday. Another reason is that the most suitable holiday time for Kyrgyzstan, which lives four seasons, is the summer season.

Holiday time lengths
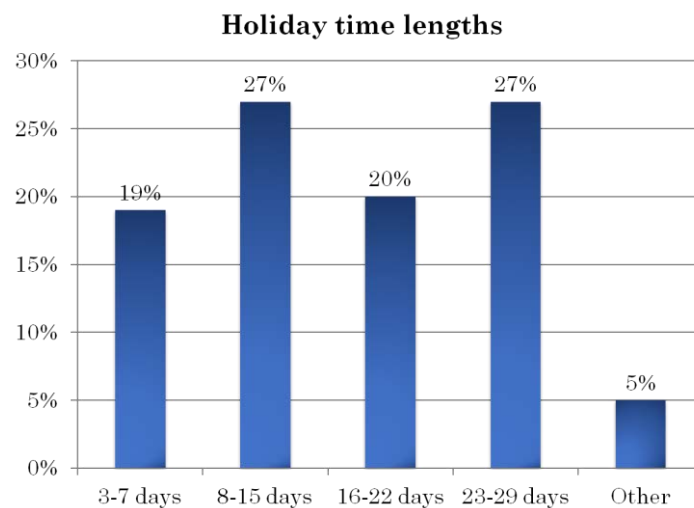
7ᵗʰ Graphic: Holiday time lengths of respondents

It was determined that the longest holiday was that of the young group between 20-25 years old. The group of those taking holiday more than 1 month is shown in the other part having the least percentage. When we take the country economy into consideration at the present day, it's apparent that the citizens of the country haven't got enough money to take long time holiday.

With whom do you take holiday?
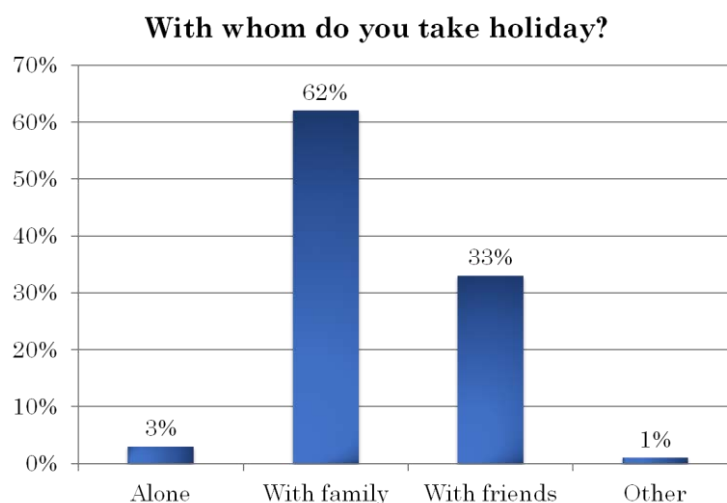
8ᵗʰ Graphic: With whom do domestic tourists take their holiday?

As we have mentioned above, Kyrgyzstan is a country regarding the value of family as high. The information that 62 % of the attendants take holiday with their family proves this, but we must state that in the last times the young and our divorced citizens take their holiday mostly with their friends.

Popular holiday types
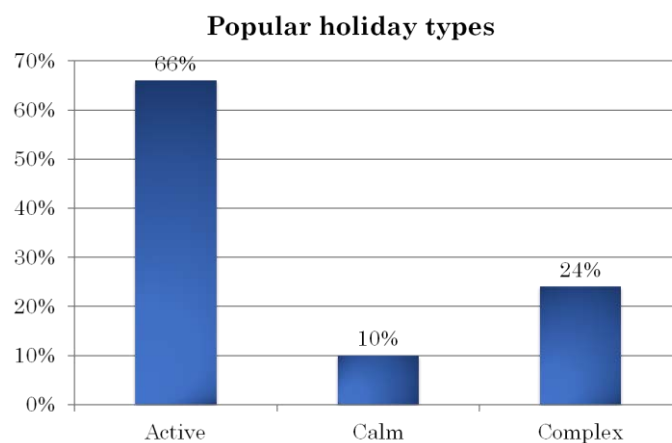
9th Graphic: Holiday types of Kyrgyz tourists

Holiday types of Kyrgyz tourists
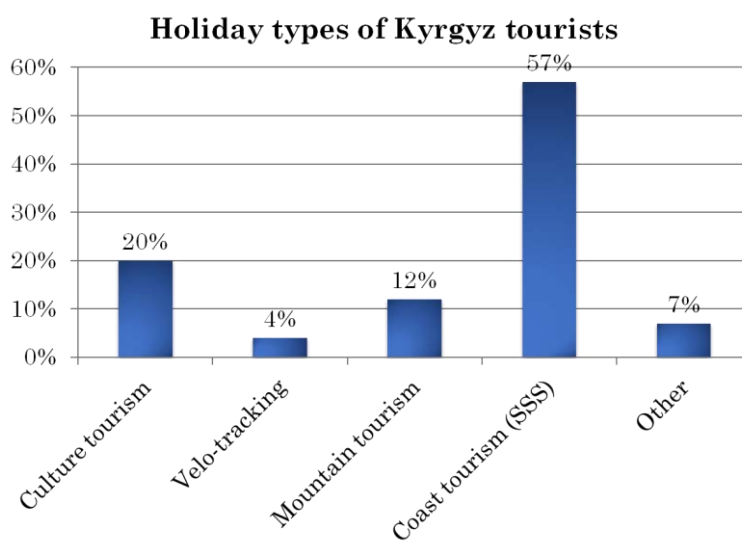
10th Graphic: Popular tourism types among domestic tourists

The sea, sun and sand tourism come first with a great portion (57 %). Now that our citizens choose the complex of active and calm holiday types, it means that this holiday type can response to their wishes.

Holiday properties
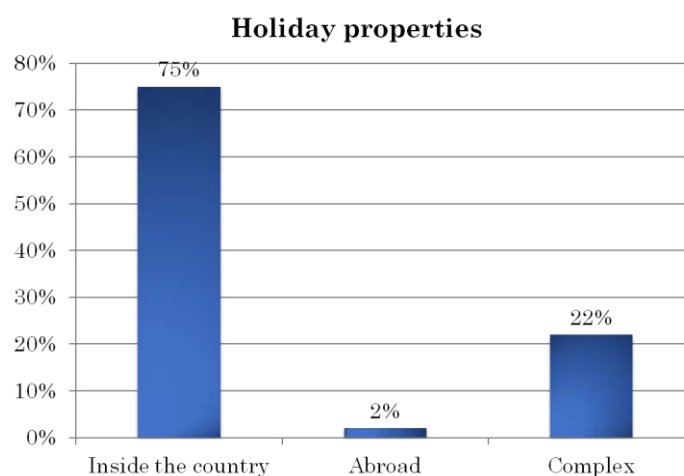
11th Graphic: Domestic and foreign holiday numbers

Distribution of holiday

Chart showing percentages by region: Chuy 16%, Zhelalabat 18%, Osh 5%, Batken 1%, Naryn 5%, Talas 2%, Ysyk-Gol 51%. Y-axis from 0% to 60%.
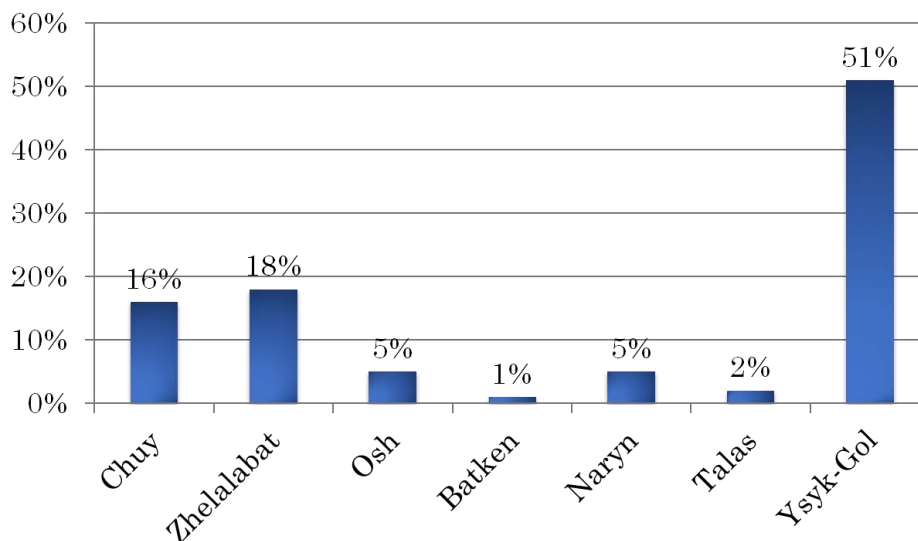
12th Graphic: Distribution of holiday according to regions of Kyrgyzstan

Since the favorite of popular tourism types given above and the largest region having coastal holiday facilities are Isık-Göl (Isık Lake), it has turned out that Isık-Göl is the dearest holiday destination of our citizens. This situation can be explained with that in our country the most popular holiday type is coastal tourism. For domestic tourism to develop balancedly, to introduce the holiday destinations taking place in other regions of Kyrgyzstan is compulsory as well.

Monthly wages of respondents

Chart showing: $200-250 50%, $250-300 29%, $300-400 12%, over $400 8%. Y-axis from 0% to 60%.
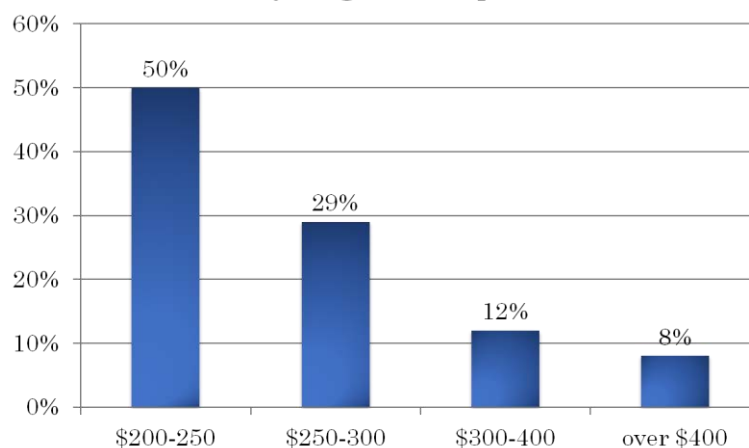
13th Graphic: Monthly wages of respondents

Distribution of money spent on holiday
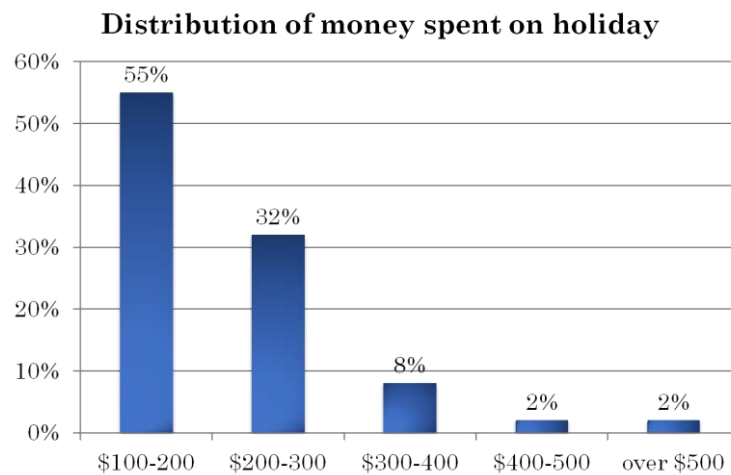
14ᵗʰ Graphic: Distribution of money spent on holiday

When we take into account that monthly wages in the country are more or less 200 dollars, it's very normal that monthly budget of the large part of the people is 200-250 dollars. This number also provides the money spent on holiday to be around 100-200 dollars.

Wanted holiday destination

15ᵗʰ Graphic: Holiday areas wanted to go

We see that as destinations wanted to go Isık-Göl comes first and after that, Celalabat comes. Just as residents of almost all southern regions have shown desire to take holiday in ısık-Göl, residents in the north of the country have shown desire to travel to southern regions.

Accommodation types used in holiday
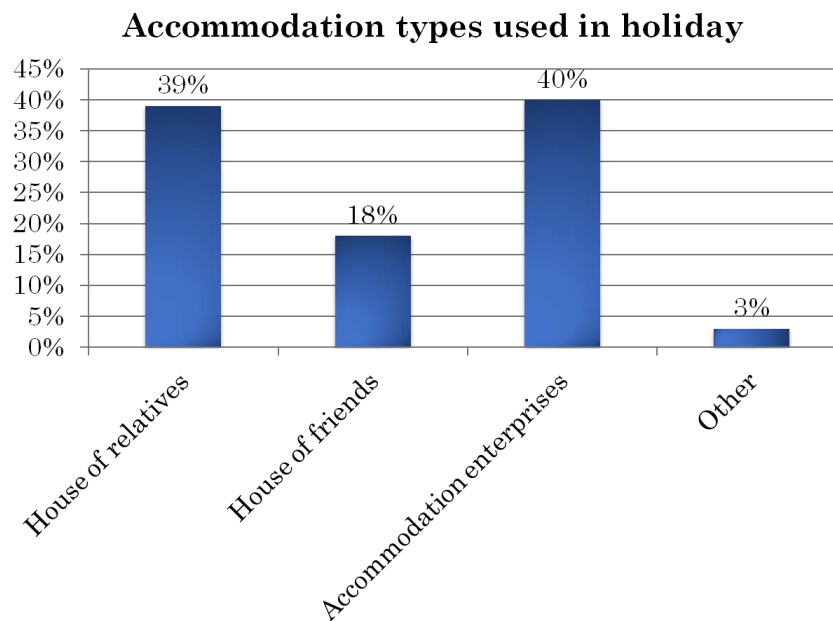
16th Graphic: Accommodation types used in the course of holiday

To explain one reason why the volume of the money spent in the course of holiday is not much is possible with this graphic. We can see that during holiday the numbers of tourists staying in accommodation enterprises and in the house of relatives are almost the same. Although the selection of the accommodation enterprises increases with each passing day, the great majority of tourists still prefer houses of their relatives and friends.
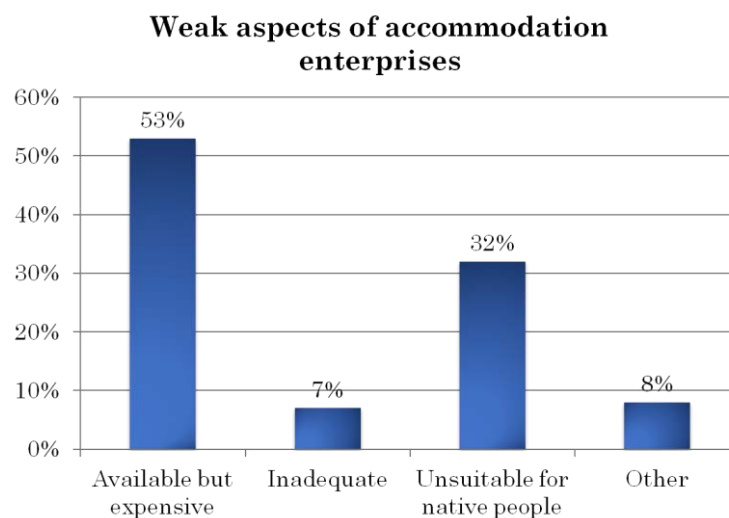
17th Graphic: Weak aspects of accommodation enterprises in our country according to respondents

As we stated in theoretical part of the research work, we see that the accommodation enterprises have been made convenient for foreign tourists rather than domestic tourists. One reason why domestic tourists have not preferred the accommodation enterprises during holiday can be this situation. It is understood that staying in the accommodation enterprises would cost much for domestic tourist.

Difficulties of traveling in Kyrgyzstan
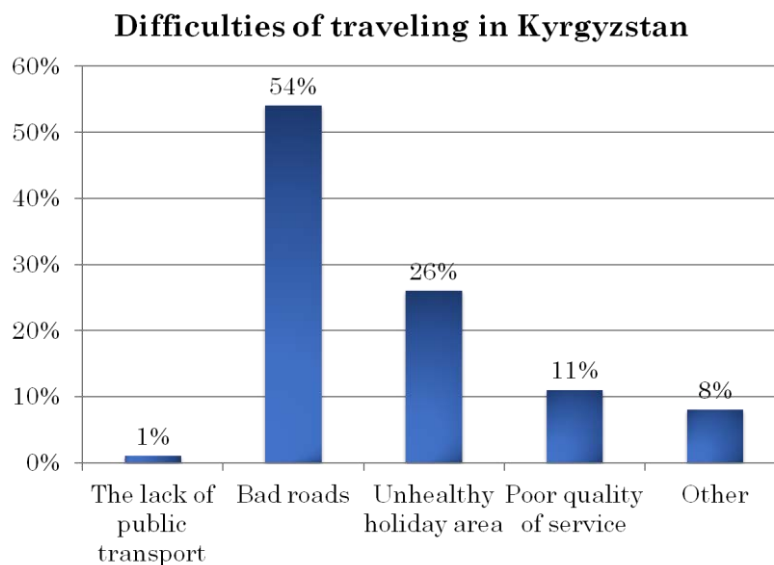
18th Graphic: Difficulties of travelling in Kyrgyzstan

We read from all publications that touristic infrastructure of Kyrgyzstan is in low level. In the State tourism development programs, plans for developing infrastructure are made every year. However, the situation of roads is shown as a great difficulty of travelling in Kyrgyzstan. It is clear that the situation of roads create difficulties not only for domestic tourists but also for foreign tourists.

5. Summary and Conclusions

The participation of Kyrgyz people in tourism activities shows development in every respect. It is observed that these events increase, for example, in hospitalizing foreign tourists, in sending tourists abroad and in attending domestic tourism. Oil and automobile industry and information technologies being giant sectors of developed economies are almost unavailable in Kyrgyzstan. Developing tourism sector multi-directionally can be stated as one of the most important decisions for Kyrgyzstan.

As the analysis of the research data has shown, in our day it shows up that domestic tourism doesn't provide enough profit to the government and tourism enterprises. Because all tourism activities are foreign tourists oriented, domestic tourists try to arrange their holidays with their own efforts. Whereas, the large part of the people is oblivious of what beautiful and wonderful destinations are available in our country. When a few destinations are selected for holiday, prices are held high since these destinations' rivals are not available.

As a result, the potential of domestic tourism is great for the country, but the State and private enterprises have to work together to realize this potential through a comprehensive plan. The introduction of holiday areas of Kyrgyzstan should be made. As we can see from the results of the research, our citizens haven't got enough information about destinations other than major touristic places of Kyrgyzstan. The accommodation enterprises and tourism companies, which can response to needs of native people, should be established.

Another reason why domestic tourism potential is in inadequate level is that the country economy is in weak level. That the people may take holiday for long time and increase their expenses depend on that they can increase their income in the country they work. So wages of people working in the public sector should be increased.

Other than this, education should be advanced to be able to understand what the people regard as holiday and what the native people expect from holiday, which forms the basis of holiday arrangements of people. The State should make more detailed research about this subject and make similar studies in other cities as well, and focus on introducing touristic and cultural values.

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Bank And Non-Bank Financial Institutions And The Development Of The Nigerian Economy

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Abstract

The focus of this study was on the impact of bank and non-bank financial institutions on the growth and development of the Nigerian economy. In an attempt to achieve the objectives of the research, data for the period 1992 to 2012 were collected from the CBN publications. Hypotheses were also formulated. The data collected were analysed using the E-views econometric software under the ordinary least square (OLS) regression analysis. The study as confirmed by the result of the joint test revealed that the financial institutions play prominent role on the growth and development of the Nigerian economy. However, it was further revealed that individual contributions of the explanatory variables varied. For example, the Deposit Money Banks were revealed to have impacted very insignificantly to the growth and development of the Nigerian economy. This may not be unconnected with the unwholesome practices in the banking sector such as granting of loans/advances to "ghost" applicants, diversion of loans and advances granted, high incidence of moral hazards. In view of the above, it is recommended among others that government should come up with lending policies that will not only reduce diversions of bank loans/advances but will deter persons involved in such sharp practices. Such loans and advances which must be on long-term basis should be extended to needy investors in the real sector. Consumer loans and also loans and advances for commerce do not play prominent role in the growth and development of the economy and thus should be discouraged. The current and on-going reforms in the financial sector should be encouraged and maintained.

Keywords: Loans And Advances, Moral Hazards, Adverse Selection,

Introduction

Banks are financial institutions that engage in the acceptance of deposits and safe keeping of valuables (Jhingan,2005). On the other hand, Non-Bank financial institutions (NBFIs) are financial institutions that do not have full banking license and are not fully supervised by national or international banking regulatory agencies. NBFIs facilitate bank related financial services such as investments, risk pooling, contractual savings etc. These financial institutions (bank and non-bank) complement the activities of each other in the intermediation process in an economy. This intermediation process involves fund initialization from the surplus to the deficit units, which in turn facilitates the process of economic development.

An economy is said to be growing or developing when increases in its productive capacity later yield to more production of goods and services. It has been posited that the expected increase in economic output and a sustained increase in national income per head may not be realized if the financial sector is not sound, healthy, and virile (Nwankwo and Ejikeme, 2007). This is because a well-developed financial sector performs a very critical function such as enhancing the efficiency of financial intermediation. A well-developed financial sector also enhances investment by identifying and funding good business opportunities, mobilizing savings etc.

According to Oluyemi (1995) financial institutions are seen as the engine room for growth and development. Schumpeter (1934) affirmed this position where he identified the importance of bank and non-banking institutions in facilitating technological innovation. Several other scholars such as (Fry, 1988, King and Levine, 1993, McKinnon, 1973, Shaw, 1973) have also supported the above postulation about the significance of banks and non-banks to the growth of an economy.

In Nigeria, studies especially those of Adekunle et al (2013), Acha (2012), Okeh (2012), Adelakun (2010) have shown that the financial system is not fully developed and as such the bank and non bank institutions have not attained the standards expected from them in the process of economic development. Bank and non-bank institutions have not really met with the high demand for loans and advances. It has been argued that bank and non-bank financial institutions have contributed less than expected due to lack of access to funds

In view of the above problems, the study investigates the activities of banks and Non-bank financial institutions in relation to the growth and development of the Nigerian economy.

The purpose of this study is to investigate the impact of Bank and non-bank financial institutions on the growth and development of the Nigerian economy.

The specific objectives include to:

➢ Determine the impact of loans and advances of Deposit Money Banks on the growth and development of the Nigerian economy;

➢ Ascertain whether Finance Companies Domestic Credits have significant impact on the growth and development of the Nigerian economy;

➢ Investigate whether Insurance Companies' Total Investments have significant impact on the growth and development of the Nigerian economy;

➢ Ascertain the effect of Microfinance Bank Total Loans and advances on the growth and development of the Nigerian economy; and

➢ Make appropriate recommendations where necessary.

The study also formulated relevant hypotheses related to the various objectives of the study. These hypotheses, anchored on the objectives of the study, constitute a cornerstone of this study.

From the foregoing the following Hypotheses have been formulated.

❖ The activities of banks and non-bank financial institutions do not have significant impact on the growth and development of the Nigerian economy.

❖ Loans and advances of Deposit Money Banks do not impact significantly on the growth and development of the Nigerian economy.

❖ Finance Companies Domestic Credits have no significant impact on the level of growth and development of the Nigerian economy.

❖ Insurance Companies Total investments do not have significant influence on the growth and development of the Nigerian economy.

❖ There is no significant correlation between the total loans and advances of Microfinance banks and the level of growth and development of the Nigerian economy.

The study therefore examines the volume of loans, advances and other investments extended by the selected financial institutions for the period 1992 – 2012 towards the growth and development of the Nigerian economy. Accordingly, such variables as Deposit Money Banks Total Loans and Advances, microfinance banks, total loans and advances, finances companies, Domestic credit, Insurance companies, total investments were used to determine their relationship with the Real Gross Domestic Product in Nigeria.

Synopsis of Related Literature

Economic growth has been a major objective of successive Nigerian governments. Ajayi (1995) noted that during the colonial era, the focus was on the provision of physical infrastructure in the belief, in line with the

prevailing economic ideas, that the facilities would induce the private investments that would produce the desired growth. After independence the government became more directly involved in promoting economic growth. The thinking was to mobilize needed domestic resources for investment in some preferred sectors. This brought banks/non-banks as financial intermediaries are expected to provide avenue for people to save or invest incomes not expended on consumption. It is from the savings accumulated that they are expected to extend credit facilities to entrepreneurs and other industrialists (Onoh, 2002). Many of the financial institutions that were in existence notably the banking institutions did not share in the vision of financing local enterprise because they were foreign owned. This gave rise to the establishment of indigenous financial institutions with a mandate to encourage local investors and hence foster economic growth. Unfortunately many of the financial institutions failed thus hindering their contribution to the economy (Ekezie, 1997). One primary reason that accounted for the high rate of failures of these institutions was that they operated in an unregulated financial environment.

Composition of The Nigerian Financial System

The Nigerian financial system comprises the money and the capital markets.
The categorisations according to Ikpefan (2012) are as follows:

- **Banking Institutions such as**
- The Central Bank of Nigeria
- The Nigeria Deposit Insurance Corporation (NDIC)
- Commercial banks (now Deposit money bank)
- Microfinance banks (formerly Community banks).
- Savings Institutions e.g. Federal Mortgage Bank of Nigeria.

- **Development Banks**

The nomenclature of development banks has changed from the former Nigeria Agricultural and Commerce Bank (NACB) to the following:
- Urban Development Bank (UDB)
- Bank of Industry (BOI)
- Bank of Agriculture (formerly Nigerian Agricultural, Cooperative and Rural Development Bank (NACRDB)
- Federal Mortgage bank

- **Non-banking Institutions**
- Nigeria Social Insurance Trust Fund (NSITF) formerly National Provident Fund – NPF
- Hire purchase and finance companies
- Insurance companies
- Investment companies
- Co-operative and credit societies

The capital market consists of the following:
- The Securities and Exchange Commission (SEC)
- The Nigerian Stock Exchange

The above named financial institutions enable capital formation to take place in the financial system. At the apex of the Nigerian financial system we have the following authorities

- Federal Ministry of Finance
- Central Bank of Nigeria
- Nigeria Deposit Insurance Corporation
- Securities and Exchange Commission
- Federal Mortgage bank
- National Insurance Commission
- National Pensions Commission

The Nigerian financial institutions can also be classified into three levels (Ikpefan, 2012):

- First level: refers to the banking institutions
- Second level: refers to the development banks or the thrift institutions.
- Third level: These are other financial intermediaries such as insurance companies, finance companies, investment companies. They are non-depository financial institutions.

Non–Bank Financial Institution and Economic Development

The primary channel through which Non–bank financial institutions assist in economic development is the intermediation process (Acha, 2012). They mobilize funds of various means open to them and make same available for investment.

Finance companies for instance make available funds raised through owners' equity contribution and borrowings from other financial institutions, individuals and companies to investors.

The role insurance companies play in economic development is strikingly outstanding. While the deposit money banks mobilize deposits from customers in the form of savings, current and fixed deposits insurance companies on the other hand aggregate the premium paid by policy holders (Esezobor, 2003).

Apart from being a veritable source of long-term funds, the insurance companies possess an unquantifiable psychological assurance, allaying the risk and loss anxiety of investors. This assurance kindles local entrepreneurial spirit and encourages foreign direct investment. Also by indemnifying policy holders in case of actual loss, insurance companies ensure production continuity and the maintenance of established consumption patterns and hence improvement of existing living standards (Pritchet, et al, 1996, Isimoya, 2003).

In addition to mobilising their own funds, some NBFIs notably development finance institutions and primary mortgage institutions obtain significant grants and loans from the government and international financial institution for onward lending. This according to Onoh (2004) aptly articulates the investment funds generating abilities of NBFIs.

Equipment financing and industrial infrastructural development are also in the domain of development finance institutions. From the funds obtained in the form of loans or grants from international financial institutions such as World Bank, these development finance institutions fund long-term investments. They further contribute to economic progress by providing advisory services, technical and managerial expertise to such projects (Okereke *et al,* 2009).

The NBFIs like Bureaux de change also helps in economic development through investment funding. Bureaux de change helps and encourages capital inflow. By offering higher rates than the official rate of exchange, citizens working abroad are thus encouraged to remit monies home. Since transactions in bureaux de change are carried out anonymously, citizen's resident abroad who wish to bring foreign exchange without passing through the official channels are given avenues to do so. The increased inflow of foreign currency which this engenders improves the country's Gross National Product (GNP) and by extension general economic well-being is enhanced (Aghogho'vbia, 2006).

Housing is one of man's basic needs and its availability is a measure of his economic well-being. In the light of this, the role played by primary mortgage institutions in housing development is of significant economic importance. Whether they are disbursing funds they generated or those from the National Housing Fund, their underlying developmental impact is in making houses available and affordable to Nigerians (Sanusi, 2003)
Another area where NBFIs have played a vital developmental role is in the reduction of money stock outside the banking system. Akpan, (1998), rightly pointed out that due to the existence of a grossly underbanked rural economy monetary policy measures instituted by the CBN are ineffective. Interestingly the introduction of the microfinance banks has helped to mop up substantial rural deposits.

Provision of a secondary market for trading in government securities by discount houses through their discount activities has also immensely contributed to the effectiveness of monetary policy especially Open Market Operations (OMO) (Adelakun, 2010). The presence of an avenue to discount these securities encourages banks and other investors to buy them and by so doing government is provided with development funds on one hand and open market operations became more effective as a monetary policy instrument on the other hand. Increased activity has been recorded in the market since the advent of the discount houses in 1993. This has improved financial structures and further deepened the financial system (Oke, 1993; Oresotu, 1993).

Finally it is apt to also state that the NBFIs contribute to the reduction in unemployment rate experienced in the country (Acha, 2012). Apart from those directly employed to work for them, there is a teaming number of unemployed graduates, artisans, farmers etc who established one business or the other from credits made available by the NBFIs. Their funding of small and medium scale enterprises is also a boost to employment as these enterprises are known to be the highest employers of labour in our economy.
At this stage it is very imperative that we have an empirical exposition on some related literature. In other words the study will at this juncture attempt to identify with some empirical findings or contributions related to the research topic under investigation.
Adeoye (2006) and Nnanna (2004) developed a model showing the relationship between financial sector development and economic growth in Nigeria. The chosen economic growth indicator is the Real Gross Domestic Product (RGDP) specified to depend on the financial indicators such as the ratio of M_2 to GDP (M_2 GDP), real interest rate (INTR) changes and the ratio of credit to private to GDP (CPGDP). Calderon and Liu (2003) noted that a higher M_2 GDP ratio implies a larger financial sector and greater financial intermediary development. Real interest rate is included to fully and appreciably capture the effect of liberalized interest rate on economic growth. According to Phill (1970) a move from negative to positive real interest rates indicates progress in financial sector reform.
To further show the relationship or association between financial development and economic growth the model developed by Erdal et al (2007), a slight modification of the growth model of Rata Ram (1999) will be considered. The secondary data for the variables for the period 1980 to 2008 were sourced from CBN, Nigeria's National Bureau for Statistics.The test then showed that there was a strong relationship between economic growth and financial development. It therefore follows that from the empirical result financial sector development promotes economic growth in Nigeria.

Aurangzeb (2012) in his own study tried to find out the impact of deposit money banks on the economic growth of Pakistan. Secondary data were sourced from the state bank of Pakistan and other official publication. The period under review was from 2001 to 2010. The variables for the survey were six namely: Gross Domestic Product, Deposits, Investments, Advances, Profitability and Interest Earning.

Dele (2007) investigated the banking reform in Nigeria by using the data of 40 commercial and merchant banks. The variables used were lending, interest rate, and foreign exchange policy. The study used the descriptive statistics to test the hypothesis. The result indicated that recapitalization has shown significance to reform the banking services and to the overall growth of the Nigerian economy.

Kayode *et al* (2010) in their contribution wanted to know the effort of bank lending and economic growth on the manufacturing output in Nigeria. Time series data for a period of 36 years (1973 to 2009) were used and the techniques used for the analysis were the co-integration and vector error correction model (VECM). It was discovered that the bank rate of lending loan significantly affect manufacturing output in Nigeria. This view point is correct because interest rate has an indirect relationship with the volume of production in manufacturing firms. As the interest rate of loans goes up, manufacturers will access little or no loan hence volume of production goes down and invariably economic growth will retard. It is however the view of the researcher that such variable as foreign exchange rate policy ought to have been included. This is because the foreign exchange rate policy in place within the period under review will to a great extent influence the manufacturing activities and hence economic growth.

Khatib *et al* (1999) had to investigate the relationship between commercial banking performance and economic growth in Qatar. Variables such as bank profit, GDP, government revenues, government expenditures, foreign interest rate were used and also the regression analysis model and (OLS) techniques were employed. The data used were for the period 1986 to 1997. The result showed that the variables are highly effective and responsible for economic growth.

In his own study Koivu (2002) investigated the relationship between financial sector and economic growth by using empirical methods and data variables. The variables were INT = Difference between lending and deposit interest rates as percentage points; CREIDT = Ratio of bank credit to private sector to GDP; RI = Reform Index; ANF = Annual consumer price index as percentages. GDP growth = Real GDP growth rate. He concluded that these variables had positive relationship with the growth of the Ghanaian economy

Fadare (2004) empirically identified the effects of banking sector reforms on economic growth in Nigeria by using the data 1999-2009. Variables used for the study are interest rate margins, parallel market premiums, total banking sector credit to the private sector, inflation rate, inflation rate lagged by one year, size of banking sector capital and cash reserve ratios. Results indicate that the relationship between economic growth and other exogenous variables of interest rate margin, parallel market premiums, total banking sector credit to the private sector, inflation rate and cash reserve ratio was negative and insignificant.

Methods and Materials

Whereas the interest in this study is to find out whether a long-run relationship exists between banks, non-banks and growth of the Nigerian economy, regression analysis based on the classical linear regression model otherwise known as Ordinary Least Square (OLS) technique is chosen by the researcher. OLS will be used on the data to test the type of relationship between variables whether positive or negative and to find out if the variables are significant or not.

In this study, we have focused on secondary type of data; all data are collected from the different official publication of CBN, federal office of statistics etc.

Model Specification

In this study, the variable used to measure the growth of the Nigerian economy is the Real Gross Domestic Product for the years under review (1992 – 2012).

Used to represent banking institutions in this study are the Deposit Money Banks (DMBs) and Microfinance Banks (MFBs). Also used as proxy for the DMBs is total loans and advances to the different sectors of the economy represented by DMBTLA (Deposit Money Banks Total Loans and Advances). As proxy for the Microfinance banks, the total loans and advances was also used represented by MFBTLA.

For the non-bank institution, finance and insurance companies were used. Used as proxy for Finance companies is the Domestic credit of finance houses represented by FCDC (Finance Companies Domestic Credit) for the years under review (1992 – 2012). Also used as proxy for Insurance companies is the total investments of insurance companies for the years under review (1992 – 2012) represented by (ICTI) ie Insurance Companies Total Investments.

Following Adekunle *et al* (2013) who studied the impact of financial sector development on the Nigerian Economic Growth where they developed a model showing the relationship between the financial sector and economic growth in Nigeria using Real Gross Domestic Product and the economic growth indicator and the ratio of M_2 (Money Supply) to GDP (M_2 GDP), the ratio of Credit to Private to GDP (CPGDP) and real interest rate changes (INTR), we now specify our model using the selected banks and non-banks individual contributions to economic growth in the area of loans, advances, investments, and domestic credit.

The functional form the model is specified thus:

RGDP =   f (DMBTLA, MFBTLA, FCDC, ICTI)
Where:

F	=	Functional Notation
RGDP	=	Real Gross Domestic Product;
DMBTLA	=	Deposit Money Bank Total Loans and Advances;
MFBTLA	=	Microfinance Bank Total Loans and Advances;
FCDC	=	Finance Companies Domestic Credit;
ICTI	=	Insurance Companies Total Investment;

and the structural form is expressed thus:

RGDP   = a_0 + a_1DMBTLA + a_2MFBTLA + a_3FCDC + a_4ICTI + U
Where:

a_o	=	Constant term
$a_1 - a_4$	=	Parameters to be estimated
U	=	Stochastic variable or error term incorporating other factors that are not considered in this model.

A Priori expectation can be expressed mathematically as a_1, a_2, a_3, a_4, >0

Having stated the above, this study will further use the Econometric views (E-views 6.5) software in running the regression. Thereafter the following tests will be carried out.

Unit Root Tests:
Cointegration Tests:
Granger Causality Test:

Data Estimation and Analysis
This section provides in detail the analysis of data used in the study and interpretation of the empirical results.

Unit Root Test

Non – stationary data produces spurious regression hence the result may be misleading. Therefore it is cognizant to establish the stationarity of data. The unit root test is therefore carried out using the Augmented Dickey fuller (ADF) test in order to determine whether the data set is stationary and the order of integration.

Table 4.2: Summary of Unit Root Test Results

Variables	ADF 2nd Diff	Mackinnon critical value at 5%	Order of integration
DMBTLA	-3.396852	-3.098896	1(2)
FCDC	-5.095630	-3.081002	1(2)
ICTI	-3.80091	-3.052169	1(2)
MFBTLA	-5.931347	-3.081002	1(2)

Source: E-views 6.5

From the table above, all the variables are stationary at second different because their respective ADF statistic are greater than the Mackinnon critical value of 5%. It also shows that the variables are co-integrated in the same order.

Johanson Cointegration Test
Table 4.3 Cointegration Rank Test

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.995592	174.2159	69.81889	0.0000
At most 1 *	0.845255	76.57983	47.85613	0.0000
At most 2 *	0.794857	42.99229	29.79707	0.0009
At most 3	0.551099	15.47946	14.49471	0.0017
At most 4	0.003456	3.062323	2.841466	0.0028

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.995592	97.63609	33.87687	0.0000
At most 1 *	0.845255	33.58755	27.58434	0.0075
At most 2 *	0.794857	28.51283	21.13162	0.0038
At most 3 *	0.551099	14.41714	14.26460	0.0473
At most 4	0.003456	4.062323	3.841466	0.0028

Table 4.4 Granger causality test

Pairwise Granger Causality Tests
Date: 11/28/14   Time: 12:25
Sample: 1992 2012
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
DMBTLA does not Granger Cause RGDP	19	1.33539	0.2946
RGDP does not Granger Cause DMBTLA		22.6735	4.E-05
FCDC does not Granger Cause RGDP	19	12.6434	0.0007
RGDP does not Granger Cause FCDC		0.32647	0.7268
ICTI does not Granger Cause RGDP	18	0.43981	0.6534
RGDP does not Granger Cause ICTI		3.80116	0.0501
MFBTLA does not Granger Cause RGDP	19	4.11825	0.0392
RGDP does not Granger Cause MFBTLA		17.7036	0.0001
FCDC does not Granger Cause DMBTLA	19	0.79022	0.4730
DMBTLA does not Granger Cause FCDC		2.65631	0.1052
ICTI does not Granger Cause DMBTLA	18	65.1251	2.E-07
DMBTLA does not Granger Cause ICTI		1.42139	0.2765
MFBTLA does not Granger Cause DMBTLA	19	13.9801	0.0005
DMBTLA does not Granger Cause MFBTLA		3.56694	0.0560
ICTI does not Granger Cause FCDC	18	30.0170	1.E-05
FCDC does not Granger Cause ICTI		4.56304	0.0315
MFBTLA does not Granger Cause FCDC	19	0.16509	0.8494
FCDC does not Granger Cause MFBTLA		4.38593	0.0332
MFBTLA does not Granger Cause ICTI	18	7.35049	0.0073
ICTI does not Granger Cause MFBTLA		11.4327	0.0014

After applying the causality test, we found a bi-directional causal relationship of Microfinance bank total loans and Advances (MFBTLA) and Insurance companies total investments (ICTI). On the other hand, we found a uni-directional causal relationship of FCDC and RGDP, RGDP and MFBTLA and also MFBTLA and DMBTLA.

Table 4.5

Dependent Variable: RGDP
Method: Least Squares
Date: 11/28/14   Time: 12:12
Sample (adjusted): 1992 2012
Included observations: 20 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DMBTLA	-2.069172	1.638699	-1.262692	0.2260
FCDC	17.21131	118.8475	0.144818	0.8868
ICTI	63.32331	20.62990	3.069492	0.0078
MFBTLA	394.8036	158.8867	2.484812	0.0253
C	2674684.	1060023.	2.523233	0.0234
R-squared	0.933885	Mean dependent var		12010459
Adjusted R-squared	0.916254	S.D. dependent var		11062538
S.E. of regression	3201369.	Akaike info criterion		33.00837
Sum squared resid	1.54E+14	Schwarz criterion		33.25731
Log likelihood	-325.0837	Hannan-Quinn criter.		33.05697
F-statistic	52.96940	Durbin-Watson stat		1.886083
Prob(F-statistic)	0.000000			

The value of Durbin Watson (DW) statistic in the model is 1.886 which is nearer to 2. This indicates that there is no significant auto correlation in the model and the regression model assumes that the error deviations are uncorrelated.

 The coefficient of Determination (R^2) is 0.934. This represents the correlation between the dependent and independent variables. This value (0.934) means that the independent variables in the model can predict 93.4% of the variance in the dependent variable (RGDP).

Model Estimation
Our mode estimation is
RGDP = a_0 + a_1 DMBTLA + a_2 MFBTLA + a_3 FCDC + a_4 ICTC
Where:
RGDP = 2674 684 – 2.069172DMBTLA + 394.8036 MFBTLA + 17.21131 FCDC + 63.3233ICTI

Discussion of Results

The results of the model show that the time series properties of the variables in the model, the Augmented Dickey Fuller (ADF) Unit toot test were conducted. The ADF revealed that all variables namely:
Deposit Money Bank Total loans and advances (DMBTLA), finance companies domestic credit (FCDC) insurance company's total investment (ICTI) and microfinance bank total loans and advances (MFBTLA) were stationary at second difference.
The model equation is thus specific as below:
RGDP – 2674684 – 2.069172 DMBTLA + 394.8036MFBTLA + 17.21131 FCDC + 63.32331 ICTI

From the above model equation, the Deposit Money banks' total loans and advances have negative relationship with the of Real Gross Domestic Product while Microfinance banks' total loans and advances, Finance companies Domestic credit and Insurance company's total investments had positive relationship with the real GDP

A look at the negative relationship of the deposit money bank total loans and advances and the Real Gross Domestic Product shows that it is not in tune with our apriori expectation. A further look at Hypotheses two (H_0) shows that the Tcal < tab which led to the acceptance of the Null Hypothesis that deposit money banks loans and advances do not have significant impact on the growth and development of the Nigerian economy. This position is not in agreement with the findings of Aurangzeb (2012) where they stated that deposit money banks activities in Pakistan have significant impact on the economy. Kayode, et al (2010) and Oluyemi (1995) also affirmed that the rate of bank lending significantly affects economic growth and development in Nigeria. It is however the view of the researcher that the effects of sharp practices in the Nigerian banking industry may not be unconnected with this type of result. The volume of loans and advances claimed to have been released may not after all get to the real sector. Again the effect of moral hazards in Nigeria is alarming. Most loans and advances by the banks are either diverted or misappropriated.

Also under Hypothesis three (H_0), the Finance companies domestic credits have been identified as having not impacted significantly on the growth and development of the Nigerian economy. The reasons for this result may not be far fetched from those in the Deposit Money bank.

Hypothesis four (H_0) states that Insurance companies total investments do not have significant influence on the growth and development of the Nigerian economy. The result of our tests revealed that this Null Hypothesis was rejected implying that the total investments by the insurance companies impacts significantly on the Nigerian economy. This result is in line with the views of Damar et al (2006), Richard Sylla (2005).

Again, Hypothesis five states that there is no significant correlation between the loans and advances of Microfinance banks and the level of growth and development of the Nigerian economy. Again a look at the result of our test revealed that we rejected this Null Hypothesis and accepted the alternate. This further implies that the total investments by microfinance banks have actually impacted very significantly on the growth and development of the Nigerian economy. This result is a confirmation of the findings of Adeoye (2006) and Nnanna (2004).

Summary of The Findings

- The Deposit Money bank Total loans and advances, microfinance bank total loans and advances, insurance companies total investments and finance companies domestic credits jointly have significant impact on the growth and development of the Nigerian economy.
- The individual tests of significance carried out using the t-test showed that:
  - The Deposit Money banks' loans and advances had a negative and insignificant impact on the growth and development of the Nigerian economy. This study identified the following as possible causes. They include diversion and misappropriation of loans granted, high incidence of moral hazards, granting of loans to "ghost" applicants, poor or weak credit policies, adverse selection by credit officers among others
  - The Finance companies Domestic credits do not exert significant impact on the growth and development of the Nigerian economy. The reasons for this according to the researcher may not be far-fetched from the reasons for poor impact of deposit money banks on the Nigerian economy.
  - The insurance companies total investments have significant impact on the growth and development of the Nigerian economy. This implies that virtually all investments by the insurance sector had been very judiciously and efficiently handled.

- The loans and advances by microfinance banks have significant impact on the growth and development of the Nigerian economy. This result shows that microfinance banks being rural based had actually extended loans and advances to needy local entrepreneurs for developmental purposes.

Conclusion

This study started by identifying the various bank and non-bank financial institution operating in Nigeria. It went further to highlight the roles they play in economic development.

Also the relationship between bank and non-bank financial institution and economic development in Nigeria was investigated. The empirical results showed that there is a substantial positive relationship between bank and non-bank financial institution and economic development in Nigeria, that is to say, that the activities of bank and non-bank financial institution promote economic growth and development in Nigeria.

Based on our findings above, the study concludes as follows:

➢ That the entire explanatory variables jointly met the a priori expectation, i.e. the activities of bank and non-bank financial institution substantially influence the growth and development of Nigerian economy.

➢ That the lending policies should be reviewed especially in the banking sector. This is because activities in the deposit money banks should expectedly exert more influence on the growth and development of an economy.

Recommendations

In view of the findings of this research work, the following recommendations are hereby offered:

➢ The CBN should review its lending policies with a view to making them more pro-active. This means that more attention should be given to long-term loans and advances for developmental purposes. Again consumer loans should be de-emphasised.

➢ The CBN should organise a clearing system for microfinance banks. This will enable them play more active role in the money market and not continue to operate at the mercy of their correspondent deposit money banks. Some of the correspondent banks are known to slow down the microfinance banks with harsh conditionalities.

➢ The recent reforms in the financial sector should be encouraged and made more rewarding.

➢ Finance companies should make efforts in enlightening the public on their financial activities and create awareness on their relevance. They should also endeavour to diversify their products and thus meet the demands of the present state of economy.

➢ A closer examination of the operations of insurance companies is advocated. This will make them to be more responsive to their duties.

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Aesthetic Development in Male Students in Iran

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Abstract

In this study we examined aesthetic development in 75 male students in Iran from 5 age groups (7–9, 9–11, 11–13, 13–15, and 15–17 years old). Students were presented with 8 paintings (2 from each of the 4 different styles). Paintings were presented one at a time and students were asked to explain in writing what they thought about each painting. Responses were coded and the results suggested that participants from different age groups had different ways of describing aesthetic paintings. Responses of the first three groups (ages 7–9, 9–11 and 11–13) reflected Objectivism, the responses of Group 4 (ages 13–15) reflected Story-Telling, and Affectivism was reflected in the responses of only the oldest students (ages 15–17). These findings are quite similar to those found in female students in Iran and may provide support for a developmental progression of aesthetic development.

Keywords: aesthetic development, student, art, painting, Iran

Aesthetic Development in Male Students in Iran

The notion of aesthetic development has yielded several theoretical conceptualizations and practical studies recently that highlight the importance of examining this concept. Despite some theorizing, there are still questions about the nature of aesthetic experience: is it cognitive, moral, or philosophical, or is aesthetic experience a combination of all of these elements (Parsons, Johnston & Durham, 1978)? Whichever definition one accepts, "the aesthetician is primarily concerned not with the artworks, but with the way we think about them" (Parsons et al., 1978, p. 7). Fechner's 1876 book, *Vorschule der Aesthetik* [The Elements of Aesthetics], was one of the pioneering pieces in the field of experimental aesthetics. Subsequently, Baldwin (1906-1911) developed a cognitive developmental framework of aesthetic development that preceded Piaget's (1957) cognitive developmental theory by several decades (Parsons, 1980), highlighting the utility of cognitive developmental frameworks across domains other than school performance.

In this paper, we review three developmental conceptualizations of aesthetics: Housen's (DeSantis & Housen, 2009; Housen, 1980, 2002, 2007), Parsons' (Parsons, 1980, 1986, 1987a, 1987b, 1994; Parsons et al., 1978), and a recent Iranian model introduced by Rashid, Worrell, and Kenny (2014). We then examine aesthetic development in a sample of male students in Iran in light of these three conceptualizations, which are cognitive-developmental in orientation and have empirical support in the extant literature.

Extant Theories of Aesthetic Development

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Parsons' theory. Parsons' (1987a, 1987b) approach is rooted on Kant's (1790) view about human cognition. Parsons believed that cognition has three basic divisions: the empirical (or outer world of nature), the moral (or social world), and the aesthetic (or inner world of needs and desires), and he assumed that these three aspects of cognition were different because they focus on three different worlds. Based on this premise, Parsons (1986) contended that individuals' responses to artwork are different from their responses to other kinds of objects, as aesthetic experience differs from moral experience and scientific thought. Parsons (1986) also claimed that changes in aesthetic development paralleled changes from the initial state of egocentrism to a stage of autonomous sociality, and he used this developmental framework to guide his study of aesthetic development based on students' actual interpretations and understanding of artworks.

In Parsons' (1987a, p. 38) view, the understanding of paintings "develops through a sequence of interrelated assumptions and that each successive set of assumptions provides a more adequate way of understanding paintings than the previous one." Based on semi-structured interviews, Parsons (1987b) identified five stages in aesthetic development based on directive interviews with individuals from preschool to adulthood. In Stage 1 (*Favoritism*), individuals' responses reflect lack of awareness of others' experiences. Their focus is on of the subject of a painting, but conceptualized as simply a collection of colors and things. In the *Realism and Beauty* stage (Stage 2), individuals assume that a painting has the same qualities as its subject. For example, "a painting is better if the subject is attractive" (Parsons, 1987a, p. 22). Individuals in this stage focus on visual qualities of the artwork (Parsons, 1987b).

In Stage 3, *Expressiveness*, individuals begin to interpret the meaning of paintings based on their prior experiences and the experiences of others. In Stage 4, *Style and Form*, the meaning of the painting is social rather than individual. Parsons (1987a) contended that the artwork's meaning is constructed when individuals look at and *talk* about it. The final stage (Stage 5) is called *Autonomy*. In this stage, judgments are personal as well as social. On the one hand, judgment relies on the one's own experience. On the other hand, it is important to talk with others about the work to come up with an appropriate interpretation of the painting. Thus, interpretation in Stage 5 involves both the individual's point of view and the points of view of others (Parsons, 1987a).

Housen's theory. Subsequent to Parsons' (1986, 1987b) studies, Housen (2001, 2002) developed the Aesthetic Development Interview (ADI) as another way of assessing what individuals think as they watch a painting. The ADI uses an open-ended, think-aloud protocol with individuals as they look at artwork and can be described as a non-directive monologue. The interviewer begins with a single question, "What is going on here," and can also ask a follow-up question, "Is there anything else?" In response, participants describe everything that they see and think as they look at a piece of art. Based on interviews with a diverse sample consisting of regular museum goers over 15 years old, although differing in age, educational level, expertise in art, ethnicity, and nationality (Kazakhstan, Lithuania, Russia, and the United States), Housen (2001) identified five stages of aesthetic development ranging from novice to expert. The stages are not dependent on the age of the respondent; rather, they reflect the length of exposure to art (DeSantis & Housen, 2009).

Participants in Stage 1 are called *Accountive* viewers and are described as storytellers and list-makers. These viewers identify objects and other phenomena from their life experiences and develop a story about the painting related to the associations that the painting bring to mind. Their evaluation of the artwork is based on their prior knowledge and whether they *like* the piece (DeSantis & Housen, 2009). In Stage 2, *Constructive* viewers take a slightly more distant view of artwork. Although they also use their perception and knowledge, they also apply social, moral and conventional values in interpreting works of art, using both realism and appropriateness to determine value.

Stage 3 viewers are labeled *Classifying* viewers, and this group brings a more analytic style to their interpretation, akin to art critics. They categorize artwork using their knowledge of "place, school, style, time and provenance" (DeSantis & Housen, 2009, p. 11). In Stage 4, *Interpretive* viewers "seek a personal encounter with an artwork" (DeSantis & Housen, 2009, p. 11). Like the Classifying viewers in Stage 3, this group also

brings analytical skills to bear, but these skills are used alongside feelings and intuitions, as this group attempts to uncover underlying meaning and symbolism that the artwork represents. They gain new insights from a piece of art with each subsequent viewing. Finally, individuals in Stage 5, who Housen (2001, 2002) called *Re-Creative* viewers, represent the highest level. These individuals had considerable experience, having viewed and reflected upon artworks for a long time. Consequently, they had learned how to integrate their personal experiences with more universal concerns in their analysis of artwork.

An analysis of the two models. An examination of Parsons' (1987a, 1987b) and Housen's (2001, 2002) work reveals both similarities and differences, both in conceptualizations and method. Both theorists accept the notion that aesthetic development is similar to cognitive development in that it occurs in stages characterized by re-organized mental structures, and both of them use participants' responses to artwork as primary data for their models. Parsons' approach was more structured than Housen's approach, although Housen's scoring system was more elaborate and likely to yield more reliable responses (Pariser, 1988). The work of these two researchers leaves several questions unanswered. First, is the developmental progression in response to artwork generalizable to cultures beyond Europe and the United States? Second, would a non-directive approach such as the one used by Housen result in identifiable stages in individuals who are not frequent viewers of artwork.

An Iranian Theory

Both of these questions were addressed in a recent study conducted in the Middle East. In 2014, Rashid, Worrell, and Kenny examined responses to artwork in a group of students in Iran ranging in age from 7 to 17. All of the students attended public schools in Tehran, and had no formal training in or exposure to art. Given the cultural and national context—that is, single-gender schools—the study was conducted with female students in Iran. Participants were asked to respond to eight paintings using an open-ended prompt. They asked students to respond in writing to several pieces of art and analyzed the responses by coding them for "meaningful units with similar content" (Rashid et al., 2014, p. 476). Interrater agreement for a subsample of responses was 86%. They identified seven categories of responses.

Category 1, *Objectivism,* referred to individuals who only provided descriptions of paintings (e.g., yellow flowers). *Story-Telling* was the second category, and was used to describe participants who made up a narrative about the painting. The third category was labeled *Evaluating*; responses in this category consisted of evaluating the paintings in terms of beauty and appropriateness. *Affectivism* was Category 4, and participants in this category expressed their feelings about the artwork, using aspects of the paintings "as symbols of happiness, sorrow, pain, and so on" (Rashid et al., 2014, p. 477). Category 5 was labeled *Symbolizing*, as participants in this group used the painting as a symbol related to beliefs, attitudes, or thoughts that were not directly expressed in the paintings. The sixth category, *Philosophizing,* was assigned when the paintings were described in terms religion or supernatural phenomena. Finally, Category 7, *Stylism*, was used when the participants classified paintings in terms of an artistic period or style.

Rashid et al. (2014) also reported that the seven categories were related to the ages of the participants. All of the responses of the 7 to 9 year olds and 9 to 11 year olds were in the first three categories, with decreasing numbers in the higher categories. Eleven to thirteen-year olds had responses in the first four categories, and 13 to 15 year olds had responses in the first five categories, but only the 15 to 17 year olds had responses in all seven categories. The modal responses by age group are as follows: 7 to 9 (Objectivism), 9 to 11 (Objectivism), 11 to 13 (Objectivism and Evaluating), 13 to 15 (Evaluating and Affectivism), and 15 to 17 (Evaluating and Symbolizing). Only 8%, 5%, and 5% of the 15 to 17 year olds' responses were in Objectivism, Philosophizing and Stylism, respectively.

The seven categories were also compared to Housen's (2001) and Parsons' (1986) stages. As can be seen in Table 1, although there are some similarities, there are also differences. As can be seen, although Parsons' first three stages had approximate equivalents in the Rashid et al. (2014), there was no equivalent for

Stages 4 and 5, as the social aspects of Parson's last two stages was not manifested in the Iranian students. Housen's first three stages also had approximate equivalents in the Iranian data; however, Housen's first stage spanned two Iranian categories, and as with Parsons, there was no equivalent for Stages 4 and 5. Thus, both of these models did not match the Iranian data well.

Thus, Rashid et al. (2014) proposed a new developmental model with three stages encompassing the five categories of the total seven identified ones. The first stage consisted of Category 1 responses and shared the same name with the category, Objectivism. In this stage, participants simply describe what they see in the artwork, and these types of responses were most common in the 7 to 11 age group. Stage 2, Abstractivism, encompasses the categories, Story-Telling, Evaluating, and Affectivism, where responses to the paintings involve going beyond the description to providing some type of interpretation, be it affective, narrative, or evaluative. These responses were most common in the 11 to 15 age group. The final stage, Symbolizing, was only evident in the 15 to 17 year olds; these responses went beyond "factual descriptions" and "first-level inferences" to the "symbolic or latent level" (Rashid et al., 2014, p. 480).

The Current Study

A primary limitation of the Rashid et al. (2014) study was that it only included females. Thus, a study was conducted with male students to see if the findings generalized across genders. The goal of the study was to assess the responses of male students to ascertain if there is support for the aesthetic development framework found in Iranian female students. The researchers used the same methodology reported by Rashid et al. in a sample of male students of the same age. It was hypothesized that a framework with similar categories and stages as the girls would be evident in the responses of the boys.

Method

Participants

Participants consisted of 75 male students aged 7 to 17, with 15 students each drawn from five different age groups: 7-9, 9-11, 11-13, 13-15, and 15-17 years old. The sample was obtained using a stratified sampling procedure in the 22 educational districts that are present in metropolitan Tehran. One district in each of Tehran's three regions—south Tehran, central Tehran, and north Tehran—was selected at random, and three schools at each level (one elementary, one junior high, and one high school) in each of the three districts were randomly selected for a total of nine schools. Twenty-five students consisting of five boys in each of the five age groups in each region were selected randomly. The two lower age groups were selected from the elementary school, the middle age group was selected from the middle school, and the two upper age groups were selected from the high school. Thus, 10 students were selected from each of the three elementary schools, 5 students from each of the three middle schools, and 10 students from each of the three high schools. The age ranges paralleled those used by Parsons et al. (1978).

Materials

Materials consisted of copies of eight paintings from four different styles (see Table 2 for the list of paintings). Two educational psychologists who study aesthetic development and two methodologists reviewed the paintings and determined them to be acceptable for assessing aesthetic development in children and youth. Prior to conducting the study, the paintings were shown to 15 middle school (11-13 years old) students twice (15 days apart) and the students' aesthetic development category was calculated based on coding of their responses by two coders. Inter-rater agreement for coding of the responses of these 15 students was .86, and the correlation between scores on the two trials was .83.

Procedure

The study used procedures that were similar to those used by Housen (1980, 2001, 2007). Each of the eight paintings was presented to the students one at a time and the order of presentation was random. Before presenting the first painting, the following instructions were read aloud to the students:

"Please use the pen and paper to write down your opinions and thoughts about these paintings. Imagine that you are a teacher and you want to introduce these paintings to your students. Please write down on the paper whatever points you see in the paintings and/or whatever you comprehend that you would like your students to know. Provide all the details that you feel are necessary."

Students had an unlimited amount of time to respond to each painting, and on average, students took about 30-40 minutes to respond to all eight paintings.

Results

All data were analyzed by lead author. First, the smallest meaningful word groups (or units) of student responses were identified. Then, each meaningful unit was assigned to a category according to its content or meaning. Categories consisted of meaningful units with similar content and were named based on the content of the units. After assigning the meaningful units to categories, the frequencies of the units in each category were counted. Some students' responses contained multiple interpretations, and these were each coded separately.

Classification of Responses

Six categories were identified. They were labeled Objectivism, Story-telling, Evaluating, Affectivism, Symbolizing, and Philosophizing. The first category, Objectivism, was used to classify participants' descriptions of actual objects in the paintings, such as people, colors, animals, things, or trees. For example, after watching the Renoir's *Young Woman With a Guitar,* one participant wrote, "A girl in a white dress is playing a guitar." Category 2, Story-Telling, was used when participants created a narrative about the painting in addition to reporting on what they saw. For example, one participant responded to *The Café Terrace*, "On a beautiful night, all of the people came out of houses to make some nice moments." In Category 3, Evaluating, viewers made evaluative statements about the paintings. In response to *The Cafe Terrace*, one student wrote, "In general, it does not look like a good painting. Some parts of the colors are awkward, especially the fence and the people."

Participants responses that reported feelings about the paintings were classified as Affectivism (Category 4). In these responses, participants saw a section of a painting or the entire paintings as an affective symbol. For example, in response to *Young Woman With a Guitar*, one participant wrote, "After cutting off the relationship with her best friend, she feels sad and her heart is broken. Playing the guitar makes her feel better." Category 5 was labeled Symbolizing, and this category was assigned when the comments could be interpreted as symbolizing a thought, belief, or attitude that was not present in the painting. For example, one participant responded to *The Café Terrace* in this way: "The moon and the blue sky show peace and calmness." In the sixth category, Philosophizing, the respondents related the symbols in the painting either to religion or supernatural phenomena. For example, when comments such as "The power of God" were used by participants in writing about the paintings, they were coded as Philosophizing.

Relationship of Categories to Age Groups

To examine the relationship of the categories to participants' ages, we classified the number of responses by age group. These results are reported in Table 3. As can be seen in the second row of percentages in the table, all but one of the responses of the two younger groups (7 – 9 and 9 – 11 year olds) were in the first three

categories, Objectivism, Story-telling and Affectivism. The older boys had responses in these three categories as well, but in lower proportions, and the older groups also had responses in other classes, with the 11-13 year olds having responses in five categories, including Evaluating and Symbolizing, and the 13-15 and 15-17 year olds having responses in all six categories.

The numbers of responses by age group (see the top rows of Table 3) are presented in graphical form in Figure 1. Whereas Objectivism in general decreased in frequency with age, the other categories either increased with age approximately, or were not present in the younger participants. Two categories—Affectivism and Symbolizing—occurred in substantially higher frequencies than the other categories in the 15-17 years old group. Chi square tests indicated that Objectivism was significantly higher in frequency than the other categories in the 7 – 9 year olds, $\chi^2(2) = 37$, $p < .001$, the 9 – 11 year olds, $\chi^2(2) = 23.36$, $p < .001$, and the 11-13 year olds, $\chi^2(2) = 11.66$, $p < .005$. There were no significant differences between Objectivism and Story-Telling for 13-15 year olds, $\chi^2(2) = 0.94$, $p > .05$, and among Objectivism, Story-Telling, and Affectivism for 15-17 year olds, $\chi^2(2) = 5.29$, $p > .05$.

Discussion

In this study, we examined the responses to paintings in a group of male students with no formal training in art attending elementary, middle, and high schools in Tehran. Based on participants' responses to eight paintings, their responses were classified into six different categories, with greater numbers of responses being classified in the lower categories than in the upper ones on average. In general, the data had a clear linear trend, with Category 1 responses becoming less frequent over the five age periods and the top two categories occurring in the three older groups of students. In general, Objectivism (Category 1) was the most frequent category in all age groups. We begin with a comparison of these findings to those obtained with female students in Iran. Then, we discuss the findings in the context of other work in this area (e.g., Housen, 2007; Parsons, 1994).

Comparison with Female Students in Iran

In a similar study of girls of the same age, Rashid et al. (2014) found results that were very similar to the results in the current study. In the 7–9 and 9–11-year-old groups, Objectivism and Story Telling were the most frequently coded categories, Objectivism declined over the age groups, and Affectivism, Symbolizing, and Philosphizing were only coded for the older groups, increasing in frequency with age. There were also some differences. For example, Stylism, which was only present in the responses of 5% of the 15–17-year-old girls, was not found in this sample of boys, and a greater percentage of females gave Evaluating responses at all age levels than males. Differences notwithstanding, the pattern of responses for the boys in this study was quite similar to the ones found in girls by Rashid et al.

Based on the framework proposed by Rashid et al. (2014), we grouped the six categories into the three classes of aesthetic development they proposed, Objectivism, Abstractivism, and Symbolizing. It is our contention that the three classes reflect *different* ways of describing and thinking about the paintings. Although Objectivism was the most frequent type of aesthetic judgment for all age groups, more than 60% of the responses of the three youngest age groups, were straightforward descriptions of the objects that were painted. The second class, Abstractivism, consisting of Story Telling, Evaluating, and Affectivism. Story Telling and Evaluating responses were present in the two youngest groups but increased over the next three groups, and Affectivism emerged at age 11 and was present at about the same levels through age 15. Taken together, these groups constitute a greater percentage of responses in the middle age groups than Objectivism, paralleling finding reported for Iranian girls of the same age. Finally, Symbolizing, which emerged at 11, showed a substantial increase in the last age group. Although the number of responses did not increase as dramatically as it had done for the females, the pattern mirrored their female counterparts.

Comparisons with Parsons' and Housen's Models

Parson's framework. As noted in the Introduction, in general, the results had some similarities to Parsons' (1987a, 1987b) five stages of aesthetic development (see Table 1). There was some overlap between the current categories and Parsons' first three stages. Parsons reported that people's views of paintings in his first stage, Favoritism, consisted of describing collections of items such as colors and things. These literal descriptions are in accord with the Objectivism category in this study, a category in which participants reported *exactly* what they saw in the paintings. Another aspect of Parsons' first stage, that is, the associations to the responses are similar to the story-telling category in this sample. In Parsons' Stage 2, the Realism and Beauty stage, his participants classified paintings as *good* or *bad* based on the painting's verisimilitude. This type of interpretation matches the third category in the current study, labeled Evaluating, which was characterized by evaluative statements about the paintings based on their attractiveness and similarity to real life. However, Evaluating also includes a focus on technical aspects of the paintings (e.g., color coordination and harmony), which is not present in Parson's Stage 2.

Emotional responses to the pictures constitute Parsons' (1987a) third stage, Expressiveness, and these are similar to Affectivism, the fourth category in this study. Similarly, the characteristic of interpreting meaning in Parsons' third stage is similar to Symbolizing in the current study, a category in which interpretations that are not evident in the pictures are inferred. As in the Rashid et al. (2014) study, Parsons' fourth and fifth stages, Style and Form and Autonomy, were not found in this study. With regard to Stage 4, although some participants referred to style, they did not refer to form, nor did they discuss constructing meaning with others. Similarly, there was no evidence for Parsons' Stage 5—interpretation based on both personal and social values—in this sample's responses. It is worth noting that Parson's used semi-structured interviews, which may have elicited input based on social and personal values in a way that the free responses that the current participants gave did not.

Housen's framework. As with Parsons' (1987a, 1987b) framework, the current study's results were similar to some aspects of Housen's (2007) theory (see Table 1). Characteristics of Housen's first stage—Accountive—are placed into three different categories in this study, Objectivism, Story-telling, and Affectivism, as we distinguished between describing real objects, story telling, and reporting feelings. It is possible that Housen did not distinguish among these groups as her samples were all over 15 years old. Thus, she may have assumed that her first stage extends from pre-school to adolescence (Pariser, 1988). Responses classified as Objectivism, the first category in the current study were similar to Housen's Stage 1 participants (Accountive), who described paintings in terms of stories, lists of familiar objects, and the emotions that they saw in the paintings (Housen, 2007). The characteristics of Constructive viewers, Housen's (2007) Stage 2, are closer to what we classified as Evaluating, the third category, with participants judging the paintings according to standards they are aware of, and not just based on personal likes and dislikes. Similarly, we categorized inferring or trying to understand the meaning of paintings as Symbolizing (Stage 6), although Housen classified this as characteristic of her third stage. In our sample, it was present primarily in the 15-17 years old.

As with Parsons' (1987a) stages, characteristics of Housen's (2007) fourth and fifth stages in were not present the current sample. Of course, the current sample consisted of students aged 7 to 17 in elementary, middle, and high schools, whereas Housen's sample consisted of regular visitors to museums and art galleries. Thus, the lack of the last two stages may be attributable to differences in the samples' ages or familiarity with looking at art, although the reason cannot be determined in this project.

Limitations and Conclusion

There are several limitations in the current study. First, the sample was all male and from a single urban area in one country. Thus, we cannot generalize these results without further study. Moreover, given Housen's

(2007) work, it is not clear if these results will apply to individuals who have had substantial exposure to or training in art. Although the findings of this study suggest that there are some broad similarities in the aesthetic development levels in keeping with those reported by Parsons (1987a) and Housen (2007), it is also important to remember that there were differences in the upper stages that seemed to be related to social interaction, something that the methodology of this study (i.e., written responses) did not elicit.

In summary, we classified students' aesthetic responses to paintings into six different levels representing three classes of responses, a finding that paralleled responses by Iranian girls in an earlier study. In spite of a general linear relationship between aesthetic development and age, many students in the upper age levels did provide responses across a range of categories, with the oldest providing responses across all six categories. The low frequency in the upper categories suggests that these categories may not be present in individuals younger than 17. The study highlights the need for future research on aesthetic development across a greater variety of participants and countries and with life-span samples from preschool to old age.

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Table 1

Comparing Iranian Categories to Parsons and Housen's Models

Iranian Categories	Parsons' Stages	Housen's Stages
Objectivism	Favoritism (Stage 1)	Accountive (Stage 1)
Story-Telling	Favoritism (Stage 1)	Accountive (Stage 1)
Evaluating	Realism and Beauty (Stage 2)	Constructive (Stage 2)
Affectivism	Expressivism (Stage 3)	No equivalent
Symbolizing	No equivalent	Interpretive (Stage 3)
Philosophizing	No equivalent	No equivalent
Stylism	No equivalent	No equivalent
No equivalent	Style and Form (Stage 4)	Interpretive (Stage 4)
No equivalent	Autonomy (Stage 5)	Re-Creative (Stage 5)

Table 2

List of Paintings Used

Name of Painting	Year	Style	Painter
Jacqueline Aux Mains Croisees	1954	Cubism	Picasso
First Steps	1943	Cubism	Picasso
Girls at the Piano	1892	Impressionism	Renoir
Young Woman With a Guitar	1898	Impressionism	Renoir
The Potato Eaters	1885	Expressionism	van Gogh
The Cafe Terrace	1888	Expressionism	van Gogh
Farming in Tuscan		Realism	Kanise
Sunflower		Realism	Unknown

Table 3

Frequencies of Categorical Classification by Age Group (Males)

Categories	7 – 9	9 – 11	11 – 13	13 – 15	15 – 17
Objectivism	94 (24.7) (71.2)	98 (25.7) (67.1)	70 (18.4) (47.3)	58 (15.2) (34.9)	61 (16.0) (31.6)
Story Telling	27 (14.1) (20.45)	41 (21.3) (28.1)	35 (18.2) (23.6)	48 (25.0) (28.8)	41 (21.4) (21.2)
Evaluating	10 (10.4) (7.6)	7 (7.2) (4.8)	14 (14.4) (9.5)	24 (24.7) (14.4)	42 (43.3) (21.8)
Affectivism	1 (1.6) (0.75)	0 (0.0) (0.0)	23 (37.1) (15.6)	23 (37.1) (13.9)	15 (24.2) (8.0)
Symbolizing			6 (12.3) (4.0)	10 (20.4) (6.0)	3 (67.3) (17.2)
Philosophizing				3 (75.0) (2.0)	1 (25.0) (0.4)
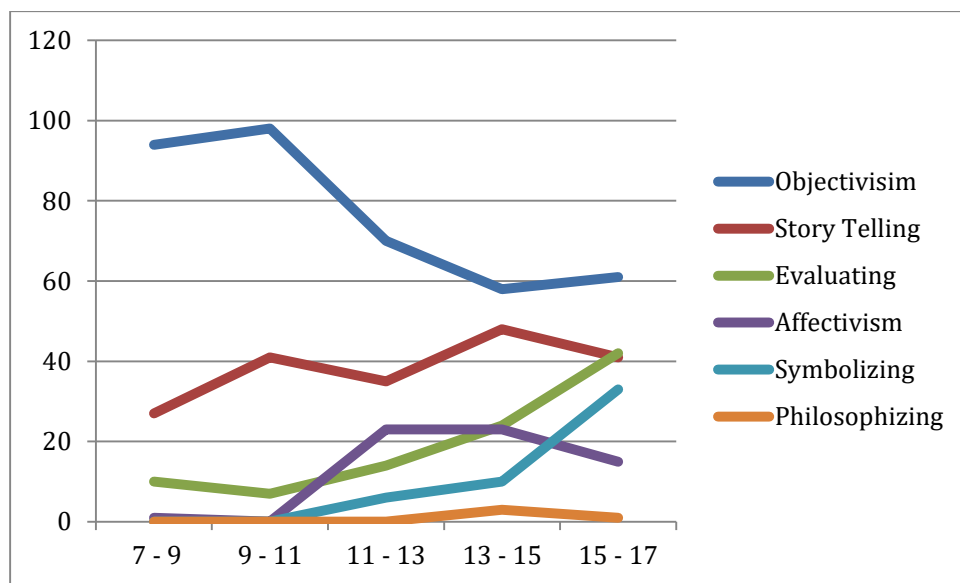
Figure 1. Graphic representation of frequencies by age group.

Introducing Model-based Design Methodology with LabVIEW to Teaching ARM-based Embedded System Design

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Abstract

This paper presents our latest experience of introducing the new topic of model-based design (MBD) concepts and tools to a Programming Tools (PT) course for educating students to be capable of utilizing modern tools for correctly developing complicated ARM-based embedded systems. It describes the course contents, student outcomes and lecture and lab preparation for teaching this topic with the emphasis on two sub-topics. Firstly, we present the details of using NI LabVIEW tool in programming ARM Cortex-M MCUs or ARM Cortex-A9 MCUs on the embedded device like NI myRIO for fast developing embedded applications. Secondly, to integrate an on-going research effort on the model-based verification into this course, we also introduce model-checking and the tools that have been utilized in the research project. This new topic helps introducing students the latest research advances which promote the wide applications of the MBD in safety-critical embedded applications. Our primary experience shows that the project-based learning approach with the graphical programming tools and selected MCUs is efficient and practical to teach the MBD of 32-bit MCUs programming.

1. Introduction

As the computing power of microprocessor and the complexity of peripheral devices greatly increase, the microcontroller (MCU)-based embedded system design become more complicated. As a result, the complexity of the program for controlling modern MCUs also increases. On the other hand, programming is often considered to be difficult for engineering students. As we observe, electrical and computer engineering students usually study only one software programming language such as C for one semester in the first year, but have little chance to apply the programming skills from that course in other courses compared with software engineering or computer science major students. When building embedded systems using MCU in design projects in the senior year, many students spend a large amount of time in debugging the C program so as to pass the compilation, but have little time to design algorithm and verify the correctness. This problem becomes worse when the code size and complexity increase. Moreover, as powerful 32-bit MCUs are embedded in larger scale mechanical devices, some mechanical engineering students are also interested in applying MCUs to their senior projects. Programming MCUs is even more challenging for them.

Model-based design (MBD) is an emerging development methodology for modern software systems. Its efficiency has been demonstrated in the development of safety-critical embedded software systems in industry. MBD promotes the use of graphical domain-specific notations to create executable design models. Automated code generation from design models to the implementation is an important feature of MBD. Engineers with limited programming experience could be greatly relieved from low-level programming and focus on the domain-specific problems. Moreover, continuous model-based verification and validation as another feature of the MBD enable early identifying design flaws so as to avoid the costly late-stage design fixes. More graphical system modeling tools started supporting MBD, such as LabVIEW from National

Instruments (NI). To be specific, NI supports using LabVIEW to directly program various microcontrollers from 8-bit microprocessor on the Ardunio, to 32-bit ARM Cortex-M and ARM Cortex-A series microprocessors (like the one integrated in the embedded hardware device myRIO).

The main objective of our Programming Tools (PT) course is to teach students modern programming tools so that they are capable of utilizing these tools to facilitate the design and implementation of embedded systems. The new topics integrated into this course cover the basic workflow of the MBD methodology, unique features of the MBD like executable specification, automated C code generation and continuous model-based verification and validation (V&V), the software tools that support MBD in the development of MCU-based embedded systems and their high-level graphical input programming languages, such as LabVIEW and Matlab/Simulink. Moreover, in order to encourage students to participate research, we also introduce a new topic of the model checking and the relevant tools that facilitates the model-based V&V, which relates to an ongoing research project conducted by the faculty. Among these newly added topics, we focus on teaching students how to use LabVIEW to directly program ARM Cortex-A MCUs and the model-based V&V. Although, LabVIEW, as a virtual instrument environment to create graphical diagrams to interface with certain NI-supported hardware and perform numerical analysis, was also exposed to students, it is our new experience of teaching students to use LabVIEW to program general-purpose MCUs.

The LM3S8962 evaluation kit from Texas Instruments and the embedded device NI myRIO are employed as two main hardware platforms to teach programming MCUs with LabVIEW in this course. The LM3S8962 kit includes an ARM Cortex-M3 MCU. We use it in lab sessions. The myRIO is more powerful. It uses the Xilinx Zynq Z-2010 reconfigurable multiprocessor architecture with two microprocessors, each of which has its own memory and peripherals. The fixed processor is an ARM Cortex-A9 dual-core processor with a fixed set of peripherals. It can be programmed by either LabVIEW or C. Another processor is reconfigurable with the Xilinx Artix-7 field-programmable gate array (FPGA). Hardware peripherals associated with it can be customized in the FPGA. We apply myRIO to developing the course projects.

This paper reports our continuous teaching efforts of introducing MBD and tools to the development ARM-based embedded systems. Our previous effort of integrating MBD concepts and supporting tools (i.e., Matlab/Simulink and Eclipse-based software programming tools, etc.) for system design modelling into this course has been reported before [1]. This paper mainly presents our experience of integrating the new topics of the MBD methodology and supporting tools for programming 32-bit ARM Cortex MCUs into an existing PT course. The description of this course is first given, including learning outcomes, course contents and project organization. Next, we present the LabVIEW lab projects developed using the selected boards. Then we present our experience of incorporating on-going V&V research to this course. Finally, the paper is ended with conclusion and future work.

2. Course description

The PT course is usually required for computer engineering or computer science major students, but an elective course for other engineering major students in many universities in US. We offer this course at the systems level, which focuses on key concepts of system-level programming (e.g., LabVIEW and Matlab/Simulink); tool chains for group software development; and advanced topics on software system design, implementation, testing strategies and documentation [2]. It is organized as 2 hours of lecture and 2 hours of laboratory per week. At the end of the course, students are capable of utilizing existing programming tools to develop a complete hardware/software embedded system as their course project. As most embedded systems design efforts in industry have moved to from simple 8-bit MCUs to modern 32-bit MCUs with real-time computing and networking capabilities, the software development became more complicated. Programming such devices to develop complex embedded systems with a large number of constraints is increasingly challenging for engineering students with limited programming background. Educators have recognized the

need to introduce some efficient and cost-effective programming tools to students [3]. Our new course enhancements on the MBD have three objectives.

- To improve students' awareness of the MBD methodology in programming modern MCUs.
- To introduce students, the MBD tools which allow programming MCUs using high-level graphical programming/modelling languages.

To develop students' appreciation for formal verification tools such as model checker to automate or semi-automate the model-based V&V for the cost-effective development of reliability-critical embedded systems.

2.1 Course learning outcomes

We derive the following course learning outcomes under the above three major objectives.

1. To demonstrate the knowledge of the MBD methodology.
    1.1 To articulate the workflow of the MBD and its unique features.
    1.2 To understand the benefits of the MBD in programming MCUs.
2. To demonstrate the capability of programming MCUs using at least one high-level graphical programming/modeling language
    2.1 To get familiar with common software tools supporting programming MCUs using graphical programming/modeling languages.
    2.2 To comprehend the underlying working mechanism of programming MCUs using high-level programming/modeling languages.
    2.3 To be able to create high-level programs using at least one graphical programming language (i.e., LabVIEW, Matlab/Simulink) to control/augment MCUs or hardware devices with microprocessors.
3. To demonstrate the knowledge of advanced model-based V&V techniques
    3.1 To understand the unique features of model-based V&V techniques.
    3.2 To understand automated formal methods (i.e. model checking and theorem proving) for proving the correctness of design and code in safety-critical applications.
    3.3 To understand the formal verification tools for the model-based V&V.

2.2 Course contents

As described in the introduction section, the new topics integrated into this course include the basic workflow of the MBD methodology, unique features of the MBD, the MBD tools that support programming MCUs using the high-level graphical programming languages, and the formal verification for the model-based V&V. Among these newly added topics, we emphasize using LabVIEW to directly program ARM Cortex-A MCUs and the application of automated formal method like model checking for the model-based V&V. Course materials were drawn from white papers, NI tutorials, presentations and manual, on-line forum, textbook, technical papers and example projects [4-12]. Table 1 shows the major course topics.

Table 1. Course topics

1. MBD concepts
Basic MBD workflow
Key features of MBD (i.e. executable design models, automated code generation)
Comparison of MBD with conventional development methodologies
2. Programming MCU using MBD
Introduction to common MBD software tools (i.e. LabVIEW, Matlab/Simulink)
Event-driven programming using LabVIEW

Graphic component library in LabVIEW with mathematical, signal processing functions
LabVIEW Embedded module for ARM MCUs
LabVIEW C Code generation
Develop LabVIEW application to program MCUs (i.e., myRIO, TI LM3S8962)
3.Model-based V&V and tool for automating verification
Model-based testing and formal method (i.e., model checking)
Model-based verification tools for testing and model checking

2.2.1 Model-based design concepts

We introduced the workflow of the MBD methodology to our students during the first week. Five basic phases from requirement analysis, system design, implementation, integration to continuous verification, were covered. Based on the MBD process illustrated in Figure 1, we discussed main differences between MBD and other software development processes like the waterfall model. Students were also guided to learn new concepts along each basic MBD step. Three unique features of the MBD were taught in detail: executable design specification, automated code generation and model-based V&V. The LabVIEW and its embedded module for developing ARM MCUs are introduced as the case study of teaching these features in practice. The experience of teaching the model-based V & V is introduced in the next section.
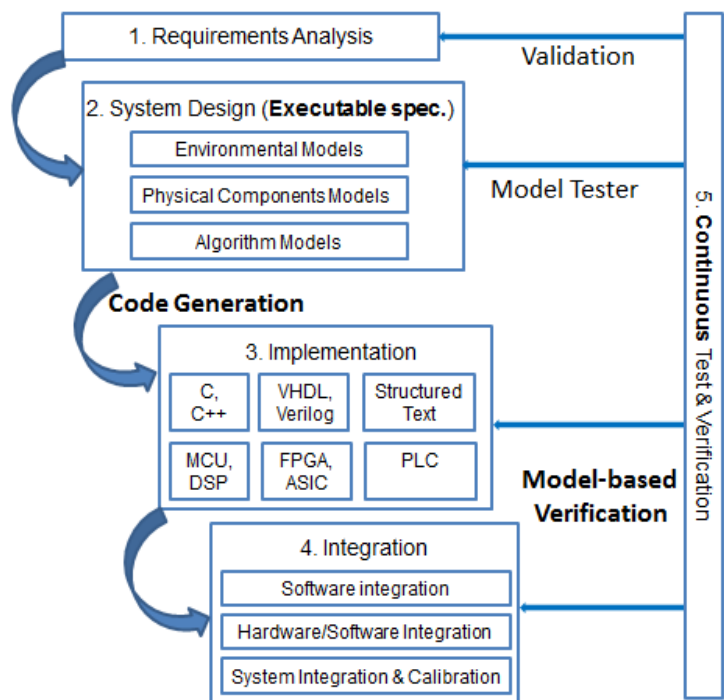
Figure 1. Main steps in Model-based design

2.2.2 Executable design specification

In the MBD, the design specification should be formulated in terms of executable models shown in Figure 1. It can unambiguously model the entire system functionality, including the environment, physical component and design algorithm. Compared with text-based design specifications, these models have one distinguished benefit of supporting early validation and testing via models simulation.

NI LabVIEW supports the MBD and creating executable specification models. One of its major strengths was in giving non-programmers a productive programming tool, lowering the barrier to software development. Its graphical design environment provides developers with a higher level of abstraction than conventional imperative programming models like C. LabVIEW supports heterogeneous compositions of several models of computation: continuous system expressed as differential equations, discrete system expressed as difference equations in the signal flow model and concurrent state machines expressed as State charts model. The predominant input language in LabVIEW is structured Dataflow which is referred to as the graphical language. LabVIEW applications are commonly design to interface with sensors, actuators, data acquisition devices and other embedded devices.

2.2.3 Automated code generation

Increasing number of automated code generation tools has been created in past ten years. Engineers with limited programming experience could be greatly relieved from low-level programming, and focus on domain-specific problems. Moreover, depending on application purposes, design models can be synthesized to different implementation languages. For example, programs coded in the Structured Text (a PLC language) are generated for PLC automation applications; VHDL or Verilog code is generated for hardware specification models in FPGA or ASIC applications; for MCU control or DSP applications, models are translated to C/C++, which are dominant programming languages in these applications.

We studied the basic features of the LabVIEW C Generator. It allows users to quickly develop design algorithms graphically in LabVIEW, create the C code that translates from the algorithms, and integrate the C code into any third-party embedded toolchain to download, run and debug it.

As a practical example, we could demonstrate students how to develop a LabVIEW program for C code generation, configure C code generation settings, generate optimized C code, and deploying the C Code from the TI Code Composer Studio IDE to the TI MSP 430 MCU.

3. Lab projects design using NI LabVIEW

The lab projects that we prepared for this course serve different teaching purposes. The lab exercises utilize the TI EK-LM3s8962 board and Keil ULINK2 debugger. These exercises were mainly developed based on the 12 example projects provided in the NI LabVIEW Embedded Module for ARM package. These projects demonstrate common MCU applications such as reading Analog inputs, CAN, interrupts, PWM generation and serial communication, etc. They can also be used as the basis to develop more complicated project. Table 2 gives an overview of seven lab projects that were introduced to students in this course.

After students completed all lab exercises, they made use of the NI myRIO to develop course projects. The online myRIO community provides a rich set of completed or ongoing projects [13]. Students have developed multiple course projects with myRIO, such as acceleration indicator, current measurement, motion detection for home security application. We expect that students could use myRIO to efficiently develop complicated applications in their senior design project.

Table 2. Lab exercises on programing ARM Cortex M3 with LabVIEW

Project Name	Function description	Learning purposes
Blinky	- Blink the status LED on the board at a fixed frequency.	- Create, build and debug the LabVIEW project for programming the EK-LM3s8962 board; - Get familiar with the component library in LabVIEW; - Program the core peripherals of ARM Cortex-M3 MCU in LabVIEW.
Analog inputs reading	- Sample analog signals and display a waveform on the on-board Organic LED screen.	- Study resources in the Element I/O category provide by LabVIEW to define System Inputs and Outputs. - Use the OLED screen control component included in the ARM category for the LabVIEW programming.
Basic interrupts	- Configure Timer to trigger an event every 500 ms;	- Study interrupt related components in the ARM category (i.e., Allow/Ignore/ Enable/Disable interrupts)

	- Once the event occurs, the program spawns a new thread and invokes the interrupt handler, which increments a counter.	- Use these components to specify the interrupt source, the condition on which the interrupt source triggers an interrupt, and the VI that handles the interrupt.
Digital Input/ Output	- Detect a button press on the UpButton and DownButon. - Increment or decrement the blinking rate of the LED according to which button was pressed.	- Study the digital Input and Output components in the sub category of "Elemental I/O" under the ARM category. - Add and apply these new elemental I/O components to a LabVIEW program.
PWM waveform display	- Initialize LCD. - Output the control value calculated by a PID module using the PWM. - Write PWM output to LCD.	Study the PWM output module and display modules specific to the selected MCUs (i.e., Display init/set background/set foreground/draw string) - Use these modules in a LabVIEW program.
CAN	- Connect the CAN board to the MCU board. - Display the status of the elements on the CAN board back to the MCU board.	Study the CAN related components in the ARM package (i.e., CAN open/start/Set receive read/write) - Use these modules for the CAN communication in a LabVIEW program.
TCP	- Set up a TCP data server which runs on a host PC and TCP data client which runs on the MCU board. - Exchange data between the server and client.	Study TCP components under the data communication category in LabVIEW. (i.e., TCP open connection, close connection, read, write listen, wait on Listener) - Use these modules for developing the TCP/IP based Ethernet connection applications.

4. Model-based validation and verification (V&V)

Model-based V&V represents a set of V&V techniques continuously applied through the MBD process. All of them contribute to three important benefits: (1) Detect errors early in the development; (2) Reuse test throughout development process. (3) Reduce use of physical prototypes. In this course, we introduce model-based V&V techniques in following three aspects.

Firstly, common quality control techniques in software engineering [14] were recapped and compared. Validation targets at answering the question "Are we developing the *right* system?", while verification aims at answering a different question "Are we developing the system *right*?" Formal method and testing are two kinds of verification approaches. In mission-critical systems, where bugs may incur disastrous effects, formal methods are employed to guarantee the correct behavior with respect to the system requirements. In comparison, testing is scalable and easy to apply although it is limited to detect bugs, but cannot ensure the correctness. Unit testing, integration testing and system testing are three common testing practices in software systems development. The purpose of recapping quality control techniques is for students to clarify the typical usage differences among these techniques.

Secondly, V&V techniques applied at different MBD steps are discussed in class. During the initial requirement analysis step, a validator is applied to ensure that extracted requirements correctly match the intended use. In the design step, a model tester or a simulator can be utilized to check whether the executable design specification satisfies requirements obtained in the first step. Unit testing is typically applied to check

if the implementation is consistent with design models. Integration testing and system testing are initiated from the integration step. Formal methods are applied to check critical components in both design and implementation.

Thirdly, latest advances of model-based V&V in both academy and industry are exposed to students. This is one of our new teaching endeavors in integrating an on-going research results into advanced undergraduate or graduate courses. This research project investigates the hybrid of automated formal method and model-based testing to achieve synergistic benefits. One of the research topics is about using model checking tool to automatically generate test cases from the design models and then applying the test cases to verifying the consistency between the design and the implementation in the later development stage. In this course, we first introduced students the basic features of model checking and then the model checking tools.

Model checking is one of the most commonly used formal techniques. The inventors of model checking have been recognized by the 2007 ACM Turing award due to the signification impacts of this approach in the hardware and software verification in industry. Model checking can be fully automatic without much expertise in formal logic reasoning. It differs from testing as it aims at an exhaustive exploration of the state space of the model, thereby providing a correctness guarantee that is rarely achieved by means of testing. More importantly, when the models under verification fail to satisfy a given specification, counterexamples (i.e., error traces) can be generated, which illustrate the erroneous behaviours of the system design. This information can be very valuable for debugging. In our research, error traces are utilized to derive test suites from design models. In this course, two active open source model checking tools were introduced to students.

UPPAAL: It is a well-known model checking tool for real-time systems [15]. With UPPAAL, the behavior of timed systems can be graphically modeled using the timed automata formalism extended with various modeling features. This tool consists of a graphical editor and simulator, and a model-checker. This checker performs an exhaustive symbolic analysis of the model and provides either a proof that the model satisfies a property, or a counterexample including a trace of actions and delays exemplifying how the property is violated. It has been applied successfully to a variety of industrial cases. Recently, this tool has been extended with new functions for test generation and controller synthesis. The ultimate goal of these updates is to enhance UPPAAL as an integrated tool suite for the MBD development lifecycle of embedded real-time systems

CBMC: It is a model checker for software verification [16]. It can take as input a low-level ANSI-C program and, formally check safety properties like the correct usage of pointer constructs, array bounds and user-provided C assertions. Given a program C, a property P and a bound k, the verification includes three steps: i) unrolling k times all loops structures in C; then ii) translating the resulting program without loops and property into a Boolean formula in Conjunctive Normal Form (CNF); and finally (iii) giving the result to a SAT solver. If the SAT solver returns false, the property holds, otherwise the property does not hold within the bound k. This tool can be used to directly verify safety-critical properties in the implementation source code and indirectly verify high-level language models like Simulink after being transformed into C code.

5. Conclusions

This paper presents our latest experience of introducing the new topic of model-based design (MBD) concepts for educating students to be capable of utilizing modern tools for correctly developing complicated ARM-based embedded systems. We firstly describe the details of using NI LabVIEW tool in programming ARM Cortex-M MCUs or ARM Cortex-A9 MCUs on the embedded device like NI myRIO for fast developing embedded applications. Secondly, to encourage students to participate the research on the model-based verification, we also introduce model-checking and the tools that have been utilized in the research project. Our primary experience shows that the project-based learning approach with the graphical programming tools and selected MCUs is efficient and practical to teach the MBD of 32-bit MCUs programming.

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English Language Teaching and Intercultural Communication Competence

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Abstract

This article discusses about the relationship between linguistic competence and intercultural communication competence, and then about the functions of English language teaching in improving students' intercultural communication competence. Finally, it explores how to develop English language learners' intercultural communication competence in English language teaching and gives some useful suggestions, so as to really realize the final objective of English language teaching.

Keywords: English language, English language teaching, linguistic competence,

1. Introduction

The changing status of English in the world as a world linguae francae has resulted in the shift of its position from a foreign or second language to a medium for international communication. And English language teaching has been very popular from primary schools to colleges and universities in China. At the same time, China boasts the largest English learning population in the world. No doubt, the objective of English language teaching as an international language has much in common with intercultural communication. Thus, English language teaching should be oriented towards the promotion of intercultural competency education through English. Meanwhile, intercultural communication competence should be highlighted as an important and inseparable part of English language teaching, because English language teaching is not only about imbibing heterogeneous culture, but also to communicate. Another reason is that "The primary function of language is for interaction and communication" (Richard and Rodgers, 1986:71). It reflects function and communicative uses of language. English language learners are required to converse with others in English fluently, whether with other students or, more pertinently, with foreigners. Accordingly, intercultural communication competence has become more and more important in English language teaching. In this article, the author tries to discuss about the relationship between linguistic competence and intercultural communication competence and then about the functions of English language teaching in improving students' intercultural communication competence. Finally, the author explores how to develop English language students' intercultural communication competence in English language teaching and gives some useful suggestions, so as to really realize the final objective of English language teaching.

2. The relationship between linguistic competence and intercultural communication competence

The famous American linguistist Chomsky (1965) said: "…implicit   language knowledge as linguistics concerned primarily with ideal speaker-listening completely homogeneous speech community, who knows its language perfectly and is unaffected by such grammatically irrelevant conditions as memory limitation, distractions, shifts of attention and interest, and errors (random or characteristic) in applying his knowledge of the language in actual performance."

Conversely, Hymes (1972) thinks that linguistic competence is a competence that deals with affairs by using language, so he puts forward the concepts of communicative competence is a definition of what a speaker needs to know in order to be communicatively competent in a speech community. In Hymes's view, a person with communicative competence acquires both knowledge and ability for language use regarding:

    1)Whether (and to what degree) something is formally possible;

    2)Whether (and to what degree) something is feasible by virtue of the means of implementation available;

    3)Whether (and to what degree) something is appropriate (adequate, happy, successful) in relation to a context in which it is used and evaluated;

    4)Whether (and to what degree) something is in fact done, actually performed, and what its doing entails. (Hymes 1972;281)

In this sense, the notion of communicative competence, like the other aspects of culture and communication, is a diverse concept, which varies across cultures as a result of different levels of expected participation, different beliefs, different social situations, different types of knowledge, and different values and standards.

With the above said, intercultural communication competence entails not only communicative competence in linguistic and pragmatic terms of the language used in the intercultural encounter, more importantly it demands awareness of different sets of cultural scripts and the ability to mediate between different cultural identities.

Intercultural communication competence can be thus defined as a person's ability to engage in productive intercultural dialogues of meanings and relationships with people from different cultural backgrounds. To make the intercultural interaction productive, one needs to have the ability to construct meaning and rapport with people from different cultural backgrounds through appropriate and effective use of verbal and nonverbal language. (Song, 2009)

At the present, the contact and communication with people from different cultures is an important way to learn more about other people and their way of life, including their values, history, habits, and even the substance of their personality. As humans we all have the same basic desires and needs, we just have different ways of achieving them. As we learn this, we can develop a tolerance for difference. This can be accomplished only when we initiate relationships with people who are different from ourselves. Therefore, the goal of English language teaching should be to increase the students' communicative competency skills, which would include not only linguistic competencies but also intercultural competence which has usually been set on trying to promote and facilitate communication across cultures. It is also quite clear that knowledge of intercultural communication can help to solve communication problems before they arise.

Increased contact with other cultures in the contemporary world makes it imperative for us to understand and get along with people who may be vastly different from us. The increased awareness and understanding of other culture and people who may not share our views beliefs, values, customs, habits and lifestyles will eventually enhance our ability to coexist peacefully with people of other cultural backgrounds and to help resolve international conflicts. (Samovar, Porter & Stefani, 2000)

3. The functions of English language teaching in improving learners' intercultural communication competence.

From the above analysis of relationship between linguistic competence and intercultural communication competence, we may easily know that English language teaching itself is the practice of not only improving learners' linguistic competence but also intercultural communication competence as the teaching of English language unavoidably involves the teaching of the cultures from English spoken countries. Moreover, English language teaching has a unique role to play in developing students' linguistic competence and to help students broaden their mind, to absorb in foreign cultural essence and to finally improve learners' intercultural communication competence.

3.1 English language teaching has a crucial role in cultivating English language learner' intercultural communication awareness

Because face-to-face contact among people of different cultural backgrounds has increased in recent years, the world has become a shrinking interdependent one. (Chen, 2010) This is the reason why Sitaram and Cogdell (1976) proclaimed that "all the people of the world should study intercultural communication" (P.15. Sitaram and Cogdell's sentiment is somewhat exaggerated, but it suggests the importance of learning more about people of other cultures.

No doubt, intercultural communication is a common daily occurrence. The communication between cultures is happening continuously, with it taking place almost every day. Today, people may find thousands of students going abroad to study, millions of foreign travelers coming to China to visit, artists giving performances in different countries and many joint venture enterprises doing business in many of our cites in China. Intercultural communication is prevalent today. (Chao, 2011)

Owing to the involvement of cultural factors, the study of intercultural communication competence becomes much more complicated. Basically, intercultural communication competence indicates: a) ability to communicate interpersonally, (b) ability to adjust ot different cultures, (c) ability to adjust to different cultures, (c) ability to deal with different societal systems, (d) ability to to establish interpersonal relationships and (e)ability to understand others. Thus, persons with intercultural communication competence must no only know how to interact effectively and appropriately with people of different cultures and different environment of different countries abut also know how to fulfill their own communication goals by respecting and affirming the multi-level cultural identities of the interactants.

At the same time, English language has become an international language. English language is always used by different people from different cultural and linguistic backgrounds to express their ideas and opinions. When English language teaching is used by diverse people from diverse cultural backgrounds, the diverse values, beliefs, world views, ways of thinking, and patterns of life embedded in the linguistic forms and the manner by which the selected linguistic forms are put into speech or text, can also be brought to the intercultural communication awareness of the students.

3.2 English language teaching is an important channel for improvement of the students' intercultural communication competence

At first of all, English language teaching can provide the students opportunities to come into contact other cultures and people in the classrooms without going abroad, because the cultures in English-spoken countries are brought to the knowledge of the students through various English language teaching materials, class activities and personal interaction with foreign teachers and students from English –spoken countries.

Needless to say, in the intercultural interaction through various types of English language teaching and English language learning, alternative ways of intercultural communication and ways of living (with their foreign language teachers) are unfolded and thus the ideology of cultural relativity will be gradually built up in the students with the enhancement of not only their intercultural communication awareness, but also their intercultural communication competence.

To some extent, the process of English language teaching and learning is a process of intercultural communication between the students' first linguaculture and the students'second linguacultures. Throughout the process, English language teachers and students are engaged in negotiation of definitions establishment or reestablishment of cultural identities in between their own linguaculture and that of others. English language teaching offers unique and important chances for the students' intercultural experience and also makes the

students' necessary experience of their personal growth into an intercultural person.

In sum, English language teaching is the most effective means of cultivation for the students' intercultural communication competence. Especially, English language has become an international language and been most widely used for intercultural communication all over the world. At the same time, English language learning has been a compulsory course in colleges and universities for most countries, the improvement and cultivation of intercultural communication competence through English language teaching can really benefit the largest number of the students than any other language teaching or any other language learning. Moreover, the students who learn and use English language will obtain the fundamental knowledge and skills for effective intercultural communication and successful career in an intercultural communicative world.

4. Some suggestions

From the above discussion, English language teaching is recognized as the important functions such as a crucial role and an important channel in cultivation of the students' intercultural communication competence. Now. it is necessary for us to explore that English language teaching for intercultural communication competence requires some measures and practices of English language teaching be set for the development of the students' intercultural communication competence. Hence, the author gives some suggestions about how to improve the students' intercultural communication competence through English language teaching.

4.1 Different colleges and universities in our country should change old syllabus and curricula which combine English language teaching with the knowledge of intercultural communication, so that students may not only learn English language but also master some basic knowledge and skills needed in intercultural communication. Now, English language is viewed as an international language and a means of intercultural communication for international interactions, affairs, business, and other fields. That is to say, teachers of English language should know the new goals of English language teaching through the new syllabus and curricula and pay much more attention to cultivating the students' intercultural communication competence for their future various work environment of globalization in the world.

4.2 English language teachers should change their old traditional teaching concepts and methods and adopt new teaching concepts and methods such as teaching modes of MOOC, Mini course and flipped class. Especially, the teachers should organize different seminars or group discussions among teachers and students on the various cultural characteristics of different English-spoken countries in the world. In this way, the students would change their own old behavior and attitude stereotypes and enhance their intercultural communication awareness, foster greater sensitivity to different foreign cultural traits, really understand cultural difference and learn to tolerate different cultures, so as to cultivate themselves to have fundamental intercultural literacy in an intercultural context.

4.3 English language teachers should change their teaching contents and provide the students with more information resources in English language teaching materials on intercultural communication, give the students more different types of courses about literature, history, philosophy and sociology, art from English spoken countries. Meanwhile, English language teachers should require students according to their different English levels to see more English film or watch the English programs on T.V. In addition, English language teachers also should ask the students to read extensively, such as English stories, novels, dramas, plays, writings of science and technology, newspapers and journals. If students might do so, they could have intercultural communication competence to understand different cultures and to respect different cultures, different values and beliefs of other people.

5. Conclusion

English language teaching involves not only a set of grammar rules and lexical items, but also a set of social conventions governing language form and behavior within a communicative group. That is to say, English language teaching cultivates students' linguistic competence, but also intercultural communication competence. As a result, English language teachers should know the relationship between linguistic competence and intercultural communication competence and understand English language teaching itself is the practice of not only improving students' linguistic competence but also intercultural communication competence as the teaching of English language unavoidably involves the teaching of cultures from the English spoken countries. And also English language teaching has a crucial role to play in developing the students' intercultural communication competence, which can help the students broaden their mind, to learn excellent cultures and absorb in excellent cultural essence from English spoken countries.

In addition, the English language teachers should adopt some effective measures to cultivate the students' basic knowledge and skills of intercultural communication, enhance the students' intercultural communication awareness through various teaching modes, so as to realize the goal of English language teaching to cultivate the students' intercultural communication competence.

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Student's Perceptions of Social Presence in an On-Line Course Using Student Presentation Software

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Abstract

On-line education offers flexibility for today's learner; however, they may perceive a lack of presence and engagement in this environment. Using the Community of Inquiry Model (COI) comprised of teacher, cognitive, and social presence, the authors examined perceptions of social presence among nursing students enrolled in five on-line courses. They also explored whether the use of oral/video software as a teaching strategy enhanced social presence. A Social

Presence Scale developed by Gunawardena and adapted by Cobb was used to survey students. Findings revealed a significant relationship between social presence and instructor satisfaction; and the number of different interactive teaching techniques employed by the instructor, such as introductions with texts and pictures. The use of oral/video software, YouSeeYou®, was also noted to foster social presence among the respondents. As the components of the COI Model are interdependent, it was found that all three are needed to support student learning goals.

The growth of online education over the past decade has provided increased educational opportunities for nursing students to achieve their academic goals. These asynchronous courses offer flexibility for both the instructor and the learner. Learners receive the information when it's most convenient and act upon the assignments when they have time to do so. Learners have time to assimilate the information and place it in the proper context and perspective prior to interaction. The disadvantage of an online offering is that learners may lack a sense of presence and engagement. Literature reveals that as blended and asynchronous learning has become increasingly popular in today's university/college settings, there has been an increasing need to enhance the courses to foster student engagement, critical thinking, and the achievement of learning outcomes. In addition, nurses in today's workforce need to be able to communicate effectively with individuals and groups, collaborate with other professions, solve problems, and skillfully use technology in their professional roles [1]. The use of the Community of Inquiry Model [2], comprised of three elements, cognitive presence, teaching presence, and social presence, has been shown to support effective educational transactions and learning in a computer mediated format.

Cobb [3] noted that social presence is a key influence of the quality of on-line instruction from a nursing student perspective. She used the Social Presence Scale developed by Gunawardena and Zittle [4] to assess satisfaction with online education; her results indicated that the participants perceived themselves as "real" or present in the on-line course offering and were likely to take additional asynchronous on-line courses in the future.

Figure 1. Community of Inquiry Model reprinted with permission from D. R. Garrison (2011)

Social presence is identified as one of three core elements for an educational experience in a conceptual framework/model of community of inquiry (COI) developed by Garrison, Anderson, & Archer [2] (Fig. 1) for use in computer mediated education. Subcategories within social presence include open communication, group adhesion, and expression of emotion. Garrison et al. supported the premise that social presence is needed to sustain a community of learners in an on-line course offering. According to the authors of the COI Model, social presence is the ability of the learner to project his/her personal characteristics as "real people" into the community of inquiry [2]; [5]. Garrison in 2011[6] revised the definition slightly as "the ability of participants to identify with the group or course of study, communicate purposefully in a trusting environment, and develop personal and affective relationships progressively by way of projecting their individual personalities" (p. 34). Another factor in social presence is recognition. Garrison et al. [2] describe recognition as the "fuel" needed to develop and maintain relationships in an online learning environment. Acknowledging student contributions as well as complimenting and encouraging students contributes to social presence in the absence of body language, eye contact, and smiles which are used in a face to face venue to demonstrate support [7].

Teaching presence, including the course design, facilitation, and active involvement by the instructor, fosters social and cognitive processes and positive learning outcomes [8]. Examples of teaching behaviors that promote social presence among learners are displaying humor, engaging in selfdisclosure, greeting learners by name, alluding to shared physical space and acknowledging and supporting learners' ideas [7]. Learners construct meaning via sustained communication and activity, and tools are needed to assess critical discourse and

reflection. YouSeeU® presentation software program is an example of such a tool. The software exists on a website where students are able to use their web camera and microphone to record a video of themselves giving an oral presentation. Alternatively, students can use a digital camera or other device to create the video and then upload it to the website. In addition, the students can upload Powerpoint® slides to synchronize with their presentation. The resulting videos can be individual or combined into a group presentation. There is also an interface where peer comments and instructor comments can be recorded. The purpose of this study was to determine perceptions of social presence in online RN-BSN courses and to ascertain whether the use of oral and video presentation software (YouSeeU®) in an online course affects students' perceptions of social presence.

Method

Sample and setting

Table 1. Social Presence Scale by Gunawardena & Zittle (1997) as adapted by Cobb (2009)

1.	Messages in the online course were impersonal
2.	Computer-mediated communication is an excellent medium for social interactions
3.	I felt comfortable conversing through this text-based medium
4.	I felt comfortable introducing myself in the online nursing course
5.	The introductions enabled me to form a sense of online community
6.	I felt comfortable participating in the course discussions
7.	The instructor created a feeling of an online community
8.	The instructors facilitated discussions in course
9.	Discussion using the medium of computer-mediated instruction tend to be more impersonal than face-to-face discussions
10.	Computer-mediated discussions are more impersonal than audio teleconference discussions
11.	Computer-mediated discussions are more impersonal than video teleconference discussions
12.	I felt comfortable interacting with other participants in the online course
13.	I felt that my point of view was acknowledged by other participants in the course
14.	I was able to form distinct individual impressions of some course participants even though we communicated only via a text-based medium

This descriptive study was reviewed and approved by the California State University, Fullerton, and Institutional Review Board and used a previously validated survey questionnaire (Table 1) to query all students enrolled in online RN to BSN nursing courses during spring semester 2013. A total of 91 RN – BSN students in the School of Nursing (SON) from the total population of 377 students responded regarding their perceptions of social presence in five online BSN nursing courses, including Professional Nursing, Nursing Research and Evidence-based practice, Art and Science of Nursing, Advanced Concepts (physical assessment), and Community Health. Students were also queried regarding the use of student presentation software that incorporated asynchronous video and slides in a single interface in one (N305) online course.

An explanation of the study was provided by the researchers to the respondents via an Adobe Connect® webinar. A cover letter explaining the study was also included on Survey Monkey®. By completing the survey, the students voluntarily agreed to participate in the study.

Instrument

The survey used was adapted from the Social Presence Scale (SPS) originally developed by Gunawardena & Zittle [4] and subsequently adapted by Cobb [3]. In Gunawardena and Zittle's original work, social presence was found to be a strong predictor of student satisfaction in computer-mediated courses. Cobb [3] used the Social Presence Scale and Satisfaction Scale [4] to query students in an online RN to BSN program to evaluate student perceptions of social presence and satisfaction with courses. She made a minor adjustment to the scale by changing the word "GlobalEd" (the computer-mediated conferencing platform) to "online nursing course" or "course." Cobb [3] found that students were "comfortable relating and interacting in the online environment and are satisfied with online courses" (p. 241).

Permission to use the Social Presence Scale was procured by the authors from Gunawardena. The adaptation made by Cobb [3] was retained for this study (the word "GlobalEd" was replaced by the words "online course"). The instrument was comprised of 14 items measured on a 5-point Likert Scale where 1 = strongly disagree, 2 = disagree, 3 = uncertain, 4 = agree, and 5 = strongly agree. The survey questionnaire also queried participants about the types of activities/media used in their respective courses and had them rank activities they perceived as most influencing their feelings of "being part of the online community of learners."

Analysis

All analyses were conducted using SPSS version 20. Descriptive statistics were used to highlight the demographic characteristics of the sample population and to examine their experiences in their online courses. Psychometric properties of SPS scale in this sample of nursing students were examined via Cronbach's α, principle components analysis (PCA), and inter-item correlations. Perceived social presence between the five classes was examined through a series of oneway ANOVAs.

Results

Demographic characteristics

Table 2. Demographic Characteristics of Population Sampled (n = 377)

	Descriptive Statistics	
	M (SD)	n (valid %)
Age	34.0 (8.4)	
Gender		
Female	320 (84.9%)	
Male	57 (15.1%)	
Ethnicity		
American Indian / Alaska Native		1 (0.3%)
Asian		132 (35.0%)
Black / African American		18 (4.8%)
Hawaiian / Pacific Islander		5 (1.3%)
Hispanic / Latino		78 (20.7%)
White		111 (29.4%)
Biracial		19 (5.0%)
Unknown		13 (3.4%)

1st Generation to Attend College

Yes	109 (30.9%)
No	244 (64.7%)
Veteran	
Yes	8 (2.1%)
No	369 (97.9%)

Table 2 illustrates the characteristics of the population sampled. As revealed in the table, the student population is older, predominantly female, and primarily comprised of three ethnic groups: Asian, Caucasian, or Hispanic (Latino). In addition, nearly one in three students identified as being the first in their family to ever attend college.

Online experiences

The majority of nursing student respondents had some experience with online courses; only 16% of the participants indicated that the course was their first online course, and 35.7% indicated that they were taking more than one online course during the semester. Within these courses, students reported a high incidence of media use and interaction; 64 % reported that instructors used video lectures or presentations, 50 % reported the use of webinar, and 40 % reported the use of student oral presentations with recorded video. Only 12 % reported no use of such activities in their online course.

When asked to indicate which of the following media "most influenced your feeling of being part of the online community," students ranked the following media and course activities as the highest: introductions with text and pictures, introductions with text only, and instructor feedback using audio. The number of media reportedly used in each of the five online courses is summarized in Figure 2. Students who experienced the YouSeeU® oral and video presentation software rated it second highest behind introductions using pictures and text.
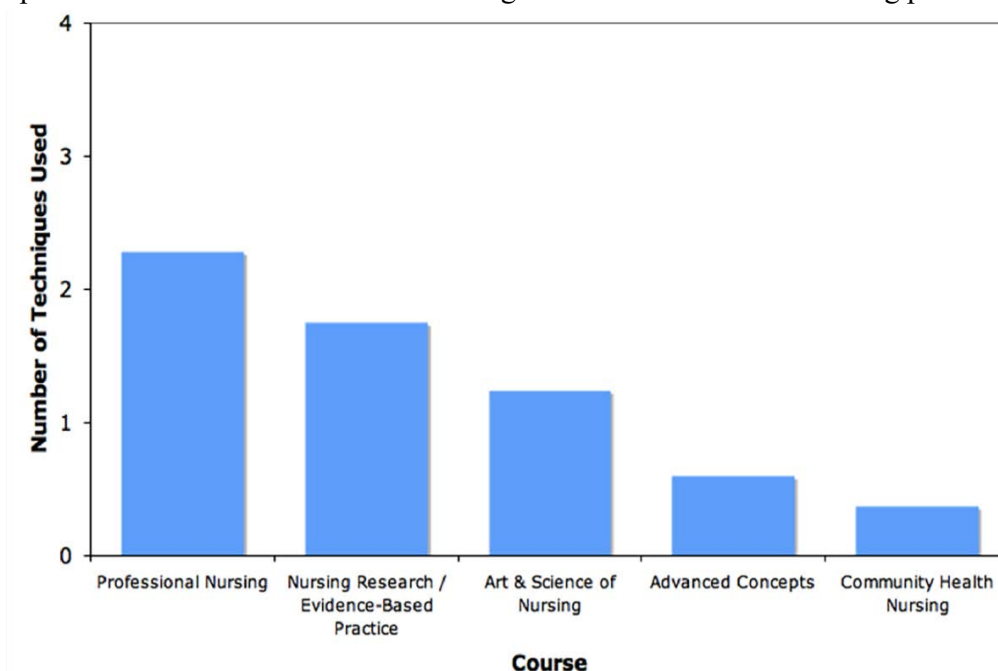
Figure 2. Average Number of Teaching Technologies/Techniques Employed across Five Online Nursing Courses (n =70)

Psychometric characteristics of the SPS scale

Table 3. Factorial Structure of Social Presence Scale

Subscale and Items	M (SD)	Component Loading	Cronbach's Alpha
Subscale 1: Comfort with Online Experience			
2. Computer-mediated communication is an excellent medium for social interactions	3.54 (1.00)	.79	
3. I felt comfortable conversing through this text-based medium	3.90 (0.90)		
4. I felt comfortable introducing myself in the online nursing course	3.99 (0.88)	.86 .85	
5. The introductions enabled me to form a sense of online community	3.49 (1.06)	.79 .87	
6. I felt comfortable participating in the course discussions	3.99 (0.88)		0.93
12. I felt comfortable interacting with other participants in the online course	3.94 (0.88)	.78	
13. I felt that my point of view was acknowledged by other participants in the course	3.83 (0.88)	.68[c]	
14. I was able to form distinct individual impressions of some course participants even though we communicated only via a text-based medium.	3.69 (0.97)	.64[c]	
Subscale 2: Perceived (relative) Social Presence			
9. Discussion using the medium of computer-mediated instruction tend to be more impersonal than face-to-face discussions	2.67 (1.09)	.83	
10. Computer-mediated discussions are more impersonal than audio teleconference discussions	2.97 (1.02)	.90	0.88
11. Computer-mediated discussions are more impersonal than video teleconference discussions	3.01 (1.01)	.94	
Subscale 3: Satisfaction with Instructor			
1. Messages in the online course were impersonal.	4.49 (1.16)	.74[b]	
7. The instructor created a feeling of an online community	3.76 (1.07)	.77[a]	0.79
8. The instructors facilitated discussions in course	3.81 (1.16)	.78[a]	
Total Scale	3.58 (0.62)	-	0.88

An exploratory factor analysis of the data was used to examine the SPS for the presence of underlying subscales. An examination of the SPS's 14-items was performed via PCA using orthogonal rotation (varimax). In addition, the decision was made a priori to examine the internal consistency of the total 14item scale and any identified subscales by calculating Cronbach's alpha in order to determine if any of the scale items should be removed. The Kaiser-MeyerOlkin measure revealed that the sample size in the study was appropriate for

PCA analysis (KMO = .81). In addition, Bartlett's test of sphericity ($x^2_{(91)}= 841.11$, $p < 0.001$) indicated that the correlations between the individual items were high enough to warrant examination using a PCA approach. Prior to rotation, eigenvalues of the unrotated matrix were calculated, producing three factors with eigenvalues of greater than one. Visual examination of inflexion with a scree plot further supported a three-factor solution. The resulting threefactor solution explained 76.62% of the observed variance in participants' responses. A total of 5 items cross-loaded onto two factors (component loadings $\square$ .40), and in each instance items were placed on the scale that resulted in the highest component loading. The factors revealed, as well as tentative descriptions of the subscale constructs, are described in Table 3.

The Cronbach's $\square$ values for the Total SPS scale ($\square$ = 0.88) and three subscales ($\square$ = 0.79 – 0.93; see Table 3) were adequate, with single item deletions making negligible improvements to the scales' internal consistencies.

a Item cross-loaded onto subscale 1
b item cross-loaded onto subscale 2
c item cross-loaded onto subscale 3

Table 4. Correlations between the three SPS subscales (n = 70)

	Subscale 1: Comfort with Online Experience	Subscale 2: Perceived (relative) Social Presence	Subscale 3: Satisfaction with Instructor
Total Scale	.89***	.37***	.77***
Subscale 1: Comfort with Online Experience	-	.02	.57***
Subscale 2: Perceived (relative) Social Presence	-	-	.11

*** p $\square$ 0.001

Table 5. Inter-item Correlations by Individual Question & by Subscale (n = 70)

		Subscale 1								Subscale 2			Subscale 3	
Subscale	Question	2	3	4	5	6	12	13	14	9	10	11	1	7
1	2	-												
	3	.70***	-											
	4	.52***	.73***	-										
	5	.70***	.63***	.61***	-									
	6	.59***	.82***	.81***	.63***	-								
	12	.46***	.65***	.73***	.48***	.73***	-							
	13	.53***	.61***	.60***	.43***	.69***	.75***	-						
	14	.51***	.49***	.49***	.53***	.64***	.64***	.80***	-					
2	9	.17	.06	-.10	.22	.03	-.14	-.12	-.04	-				
	10	.17	.08	-.05	.09	.03	-.18	-.09	.01	.59***	-			
	11	.16	.08	-.03	.12	.03	-.24*	-.11	-.01	.70***	.84***	-		
3	1	.06	.10	.01	.06	.11	-.001	.18	.16	.35**	.52***	.45***	-	
	7	.49***	.59***	.54***	.57***	.65***	.51***	.68***	.60***	-.15	-.05	-.13	.41***	-
	8	.46***	.56***	.47***	.48***	.58***	.46***	.66***	.57***	-.06	.07	-.11	.39***	.90***

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Examinations of the correlations between the subscales (see Table 4) as well as between the individual scale items (see Table 5) largely validate the 3 subscales identified during the initial PCA. For example, subscale 2's items showed strong positive correlations with one another but were generally not strongly correlated with the majority of the items in subscales 1 or 3. For Subscales 1 and 3 an correlations between items was noted, but this was anticipated due to the cross-loadings observed during PCA (see Table 3), reflecting that students' comfort in online learning environments is positively correlated with their satisfaction in online classes.

Differences in perceived social presence across classes

Table 6. Variation in Social Presence across Five Class Sections (n = 70)

Scale	F	df	p	η2
SPS Total	1.77	4, 65	.15	0.10
Subscale 1: Comfort with Online Experience	0.69	4, 65	.60	0.04

Subscale 2: Perceived (relative) Social Presence	0.62	4, 65	.65	0.04
Subscale 3: Satisfaction with Instructor	12.42	4, 65	<.001	0.43

In order to determine whether students' perceptions of the social presence within their course varied between the five classes examined, a series of oneway ANOVAs were conducted (see Table 6). The decision was made a priori to conduct post hoc analyses, if warranted, using the Games-Howell test in order to account for the unequal sizes of the samples from each class.

As shown in Table 6, no statistically significant differences between the classes were observed for scores on the Total SPS scale or subscales 1 or 2 ($p > 0.05$ for all). Further examination of η^2 revealed clinically insignificant effect sizes for each of these comparisons.

However, a substantive, statistically significant difference was observed in Instructor Satisfaction, with the Games-Howell test revealing that classes 1, 2, 3
& 5 all had significantly higher scores ($M_{difference} = 1.73 – 2.06$) than class 4.

Differences in teaching techniques employed

A one-way ANOVA revealed a substantive, statistically significant difference in the number of online teaching techniques used across the five class sections studied ($F_{(4, 65)} = 22.28$, $p < .001$, $\eta^2 = .58$), with a Games-Howell post hoc test revealing that Community Health (the course with lowest instructor satisfaction ratings) was taught using fewer techniques than any other class (all p's $< .05$; see Figure 2).

Discussion

Overall, the participants expressed a comfort level with using media and interactive activities in their online course offerings. The data revealed a high perception of social presence among the participants. The course activities ranking the highest were congruent with those identified by Borup, West, and Graham [9] and Lyons, Reyson, and Pierce [10], such as shared social identity,
"just in time" interactions, and salient on-line discussion forums. The integration of various social presence cues (humor, self-disclosure, support for learners' ideas, greetings, etc.) also seemed to enhance the perception of social presence within the course, which is also consistent with Wise et al.'s [7] findings.

Cobb [3] reported the highest scoring items in the Social Presence Scale in her study as items 4, 6, 12, and 13; all concerning comfort with communication. Congruent with Cobb's results, the highest scoring items in the present study were: # 4. I felt comfortable introducing myself in the online nursing course, # 6. I felt comfortable participating in the course discussions, and # 12. I felt comfortable interacting with other participants in the online course

Each of which was included in subscale 1, which we labeled as the broader construct "Comfort with Online Experience."

Providing a supportive online learning environment to promote meaningful learning is the primary role of the teacher. Arbaugh, Cleveland-Innes, Diaz, Garrison et al. [11] found teaching presence highly correlated with cognitive presence; they also revealed that two factors comprised the construct of teacher presence; online course design and teacher behavior throughout the course. This study's salient finding of an association between student satisfaction with instructor and comfort with online learning supports the above. It is also noted

that four out of five instructors in the courses surveyed employed a variety of interactive and innovative teaching techniques which was consistent with Anderson et al.'s [8] and Lowenthal and Parscal's [12] construct definitions regarding teacher presence.

All three dimensions of the COI Model (teacher, cognitive, and social presence) as previously stated, are interdependent on one another, and all contribute to an online environment that facilitates and supports the achievement of student learning goals.

Limitations

Nursing students in the RN to BSN program are upper division transfer students. Although a large percentage of the RN to BSN student population have historically been older and often work full time, the demographics of this population have changed in more recent years as the job market tightened and institution hiring practices changed to a preference for bachelor's prepared nurses. The group that participated in this study was a transitional group and, as such, may not represent the larger student body of the institution or the more traditional nursing student population who are characteristically younger (Table 2).

This study was limited to the students who responded to the survey and scored their perceptions of social presence, and the viewpoint of other students who were taking online nursing courses might differ from the sample group. Most students who responded to the survey were familiar with online courses and had completed an associate degree before attempting an online course at the university level. The students also completed a "Boot Camp" before taking their first courses at the university, which introduced them to technology used in the nursing program including the learning management system (LMS). This initial preparation for the program may have influenced the results.

In regards to the demographic data for the population that was studied, the results were anonymous and could not be linked to existing demographic records. As a result, the authors cannot be sure of the degree to which the sample reflected the demography of the program as a whole; response biases are possible and could limit the generalizability of the results.

Conclusion

Social presence or a shared social identity in online learning appears to be one of the key factors in satisfaction with online learning experiences. Incorporating the COI Model into educational practice and fostering social presence can be challenging for the faculty. It requires additional knowledge of technology and online teaching techniques, incorporating the use of different products, such as Socrative©, Padlet, TurnItIn® or video presentation software like YouSeeU®, and the use of videos, small group discussion forums, introductory blogs, etc.

This study adds to growing body of knowledge about social presence in online educational offerings. Additional larger scale studies regarding social presence in online nursing courses would further elucidate the value of using the COI Model in nursing distance education. As evidenced in the COI Model (Figure 1), each of the elements is not experienced in isolation; cognitive presence, where participants construct meaning via communication and activities that promote and assess critical inquiry, is created and supported in an online environment. Course activities that are structured, engaging, and "fit together" foster teaching presence. Ultimately, the learners are able to project their personal selves into the community of inquiry as "real people" in this online learning world [5].

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Taking Teaching as a Calling: The Significance and Practice of Gratitude in a Teacher's Career

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Abstract

Successful teaching experience and outcome is often dependent upon the teacher's personal charisma which includes the qualities of a sense of humor, friendliness, forgiving, understanding, caring, patience, and so on. A critical link to all these positive characteristics is that the teacher feels a deep sense of gratitude on a daily basis. This article reports on studies from the field of positive psychology that focus on grateful affect and grateful expression. As far as teaching is concerned, it reveals that gratitude is one of the most obvious positive emotions to flourish a teacher's life and career. In practice, some tools of cultivating gratitude for a teacher are introduced such as staying away from mass media, keeping a gratitude journal and keeping a gratitude reminder. It is hoped that through practice, teachers in their daily teaching experience can tune their feelings to the grateful channel and arrive at the level where teaching becomes a calling in their life.

Key Words: teaching, gratitude, significance, practice, calling.

1. Introduction

Teachers today, regardless of race, religion, or sex, are facing multiple challenges. The expectations of modern society regarding what teachers of the 21st century should be like and be able to do are many and diverse. However, a good teacher has been somebody to be desired to educate any new generation in all times. As a teacher in the 21st century, one must understand their changing roles and increasing responsibilities. Different educational cultures give priority to teachers' skills and knowledge differently. If one wants to be acceptable as a person and recognized as a good professional, they have to live up to the expectation of some highlighted roles, such as teacher as a person, teacher as a skilled professional, and teacher as an ethical person and professional.

However, considering teaching as a lifelong career and even a calling, teachers' own feelings and emotions as to be a teacher is of pivotal importance. Before being a teacher, the teacher must first be a person. All students highly valued teachers' positive personalities such as sense of humor, friendliness, forgiving, understanding, caring, and patience. After all, it is these personal characteristics that form a kind of charisma in a teacher that makes students sit still and listen, feeling secure, interested, joyful, and hopeful. What can a teacher do to cultivate these beautiful personal characteristics in themselves? A critical link to all the positive emotions is a teacher's feeling grateful to his career and students. Gratitude is a strong predictor of subjective happiness or a sense of wellbeing (Nelson, 2009; Wood, Froh, & Geraghty, 2010). So cultivating a sense of gratitude in a teacher's soul not only helps the teacher's career thrive but also extend the tunnel vision of being a mere teacher to another level of being a mission and calling on this planet. Rediscovered by the field of positive psychology, the potential benefits of gratitude have been brought into the focus of the public. A lot of research has been done to discover the happiness-driving and life-fulfilling qualities within the sense of gratitude. In this paper,

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we will explore the sense of gratitude, which a teacher feels every teaching day, to demonstrate its magical power in enhancing the positive feelings and empowering the teaching career as a calling.

2. Significance of a sense of gratitude

2.1 Conceptualizing gratitude

The word "grateful" is derived from the Latin word "gratus", meaning a deep appreciation of people, nature, God, or the cosmos, which evokes a subjective experience that includes a sense of thankfulness, wonder, and appreciation (Emmons, McCullough, & Tsang, 2003). Within the psychological literature, gratitude has been conceptualized in two ways: dispositional gratitude and state gratitude (Wood, Maltby, Stewart, Linley, & Joseph, 2008). Dispositional gratitude is a personality trait, which demonstrates itself in the tendency or proneness to experience gratitude (McCullough, Emmons, & Tsang, 2002). When one when one realizes that something good has happened because of some other person or force, he or she would experience the momentary emotions of gratitude, which is called state gratitude (McCullough, Tsang, & Emmons, 2004).

While when examining the significance of gratitude in a teacher's career, we believe it is important to understand both of these forms. In our research, we therefore distinguish between two gratitude traits: dispositional gratitude (feeling grateful) and state gratitude (enacting gratitude). Feeling grateful is an affective or emotional response to the receipt of another's benevolence, whether that is a person or supernatural force (Watkins et al., 2009). In the case of teachers, feeling grateful is the key issue to start his or her day of teaching, because this feeling sets foundation for the feeling tone of the teacher's whole day, which makes a difference to students' performance in class and the teacher's daily life as well. It is safe to say that good teachers make the day for themselves and also for students. Conversely, enacting gratitude is an expressive response, such as saying "thank you". If a teacher learns to say "thank you" to his or her students many times a day, students will feel empowered and full of hope and respect. Therefore, gratitude may be seen as an emotion or affective state created by recognizing that a positive outcome has been obtained, and recognizing the source for the outcome (Emmons & McCullough, 2003). From this perspective we are convinced that the sense of gratitude can be cultivated in a person life even if they are not born with the grateful traits or tendency.

2.2 Powerful effects of gratitude

The focus on gratitude and other positive traits has received support from some psychology-based researchers who have found that gratitude increases positive emotions, enhances optimism, defends against stress and depression, and assists individuals in both negative events and positive circumstances (Emmons & McCullough, 2003; Lyubomirsky, Sheldon, & Schkade, 2005; Froh, Yurkewicz, & Kashdan, 2009).

McCullough et al. (2002) found that dispositional gratitude or the grateful disposition makes people have a tendency to focus on the sunny side of their life. People with grateful traits in them are not merely ignoring or denying the negative aspects of life (Wood, Joseph, & Maltby, 2008) but may embrace a worldview where every trouble is considered as a challenge and everything is viewed as a gift and blessing. Thus they are more likely to feel empathetic, sensitive, and have the natural ability to take the perspective of others and less inclined to experience interpersonal emotions, such as envy, and may be more willing to forgive (McCullough et al., 2002).

Emmons and McCullough (2003) also showed that state gratitude is strongly associated with positive affect, suggesting that individuals who are able to attain a state of gratitude will experience more positive emotions. They studied 201 undergraduate participants in three groups who were randomly divided. They assigned the first group to write about five things they were thankful for each day for 10 weeks. The second group was assigned to write about the daily trouble with the focus on what was going wrong in a day. And the third group

wrote about neutral events. All participants were asked to report how they felt about life, their expectations for the following week, and how connected they felt to others on a weekly basis. The study concluded that gratitude participants reported feeling more optimistic about the following week, felt better about their lives in general, and felt more connected to others compared with the control participants.

Based on these studies, it is evident that the sense of gratitude is not only a way to communicate positive outcomes, but that it also acts as a powerful cue to enhance the quality of one's life. The expression of gratitude causes teachers not only to feel recognized and accomplished for their acts, but also to engage in improved working relationships with their students and colleagues.

3. Practice of a sense of gratitude

Not only are the findings in positive psychology relevant, but they are natural extensions of our practice. Some tools for cultivating gratitude would be introduced in this part to make the practice go smoothly.

3.1 Staying away from mass media

One of the major problems for those who seldom feel grateful is that their view is blocked or distorted by the mass media. What you see on the news is only one tiny piece of the puzzle for what becomes news in our lives is based on the narrow definitions that we see presented in programs. One of the issues is that the quality of information we take in about what is going on in the world is low and the way we process it is suspect. It is easy to go about your day thinking you have caught up on the news. However, in a 60-minute broadcast, or in the morning paper, not all the news is covered. You think that you are informed with everything, but you are not really learning anything. On the other hand, TV news programs are designed to keep you watching closely, in a state of fear and denial, desperately hoping for some relief. In between the fear-generating vignettes, the program will supply you with a way to overcome your fears and rising panic ---- many carefully placed opportunities to buy things. The commercial spots they design are often longer than the news stories themselves. The commercials are fast-paced and exciting and as a result, influence the way the news stories around them are produced.

Television (and print media) news gives us other burdens as well. It teaches us to not be concerned with depth and precision. It teaches us to overlook the details and make global, far-reaching conclusions after hearing only a few seconds about a situation. In other words, television deprives us of the precious tool of thinking, not to mention the feeling of gratitude which can only emerge with clarity of mind. How many of us can really say that these habits have not infiltrated into the way we learn and communicate in our personal lives? So in order to cultivate the sense of gratitude, staying away from the mass media is necessary. If you cannot do it in the beginning because you are in a habit of turning on TV once you come home, you can reduce the time of watching television and read the so-called importance news.

3.2 Keeping a gratitude journal

The journal is one of the most widely used tools for practicing gratitude (Emmons, 2004). As a teacher, to build a sense of gratefulness into your daily teaching life, consider a teaching gratitude journal. You can write five things down for which you are grateful for in the very beginning, such as "I'm grateful to be with those nice students today; I'm grateful to the girl named Catherine who greeted me with an angel-like smile on my way to classroom; I'm grateful to the shy boy in my class to answer a question voluntarily; I'm very grateful that all my students have done the homework I assigned last week; I'm enormously grateful that I'm learning something from my students today." You can even decorate your journal with photos of your students and keep it with you whenever you have classes. A few times a week, encourage your students to jot down things they are grateful

for. Spelling does not matter, and you don't need to write in complete sentences. Items can be very small, because if you can be thankful for small things, you are able to find more things to be grateful for and one day you would realize that you are blessed and embraced with these beautiful things every day. Every so often, before the class, the teacher can read some of the past entries out loud in front of the whole class. If a teacher can keep doing this, his or her class would be full of joy and gratitude where students are willing to learn more, because teaching is not just about knowledge and facts. Teaching is a feeling of love which connects the teacher and the students and inspires the students to think on their own and appreciate everything around them. In so doing, the teacher can create an aura of happiness and fulfillment inside and outside the classroom.

3.3 Keeping a gratitude reminder

Gratitude can also be practiced without journaling. If you are forgetful and have tight schedules in your career, try something else. Another useful tool recommended by Emmons (2007) is visual reminders which have the function of reminding a person to feel or express gratitude when they have the chance to see or touch the reminders. A teacher can choose something you have to use every day as a prompt. For example, you can choose your USB flash drive to practice gratitude if you bring your flash drive with you whenever you have classes. Every time you see or touch this flash drive, you say "thank you" to yourself, your students, or the government who offer you the job. If you have time, calm down to feel the feeling of gratefulness when you have it in your hand. The key to it is sticking to practicing it until it has formed a habit in your life like washing your face and brushing your teeth. By doing so, the teacher can shift attention from the "automatic pilot" to what is good in life. And it is easy for the teacher to feel grateful on a daily basis, even in a circumstance where hardships, difficulties and hassles are emerging. Because positive emotions can build psychological resiliency, the person who is grateful has the tendency to look at the positive side of theses things and is able to see them as blessing in disguise under such situation. And the grateful person has the ability to bounce back more quickly from negative emotional states. In addition, positive emotions have the potential to weaken persistent negative emotions (Frederickson, Mancuso, Branigan, & Tugade, 2000). For example, the practice of gratitude inhibits a person in trouble or disaster from feeling anger, bitterness, envy, greed, and inadequacy (McCullough et al., 2002).

4. Conclusion

Although the recent literature in this arena has largely come from the field of positive psychology, the practice of it can be used in many fields. And the practice of gratitude cannot be confined to religion and philosophy. As a matter of fact, it is beyond religion. When it comes to the educational field, gratitude is a way of thinking that alters a teacher's perceptions of life and the causes of events. Our research has demonstrated the importance of gratitude and provides some useful tools to practice it. If a teacher is willing to take one of these tools, it will have both momentary and long-term effects on individual functioning that can potentially enhance interpersonal functioning in teacher-student relationship. Gratitude appears to work because it increases positive emotions, which can undo negative ones and builds resiliency. We believe that this approach is valuable in furthering our understanding of the factors underlying successful teaching career.

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Effects Of The Global Financial Crisis On Bank Credit To Sme's: The Nigerian Experience

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Abstract

The aim of this study is to examine the impact of the global financial crisis on the availability of bank credit to the Small and Medium Scale Enterprises (SME's) sector of the Nigerian economy. In general terms, credit availability is a major catalyst to economic growth in any nation, and studies have shown that SME's serve as the engine room for driving industrial development, wealth creation and financial independence. The effects of financial meltdown on SME's is of great concern at this point in time. To achieve this aim, both secondary and primary data were used for the study. Chi square was used to analyze the primary data, while graph, percentages and the ordinary least square were used to analyze the secondary data. The findings of the study show that indeed the global financial crises negatively impacted the availability of credit to small and medium scale enterprises, thus worsening the credit rationing behavior of banks to the sector.

Keywords: Small and Medium Scale Enterprises, Bank Credit, Credit rationing, Global Financial Crises, Finance Gaps.

1. Introduction

Finance is referred to as the life line of any organization. This is basically because no business organization in these modern times can survive without finance as it is an important resource needed for the running of day to day business activities. Most businesses will at one time or the other need some form of credit to run their business, either at the startup stage, growth or expansion stage, or beyond. This is not restricted to the size of a business, i.e. whether micro, small, medium or large. Access to credit has been identified as one of the most significant challenges for the creation, survival and growth of Small and medium scale enterprises (SMEs) globally. 'Enterprise surveys conducted by the World Bank show that SME's face more severe financing constraints than large firms do' (IFC 2010).

The advent of the global financial crises took a toll on global economy, causing a decline in growth, productivity of nations, corporations and individuals alike across the globe. The crises affected both developed and developing countries alike depending on their level of integration into the global economy and the channel of contagion transmission. Nigeria was not left out with the crises taking its toll on the Nigerian stock markets which is a source of capital to large corporations and Medium scale businesses. It also affected banks which are major sources of funds to SME's.

Large firms usually have a wider array of finance options as compared to SME's, ranging from public to private equity, corporate bonds, bank loans and other exotic credit facilities. They are also perceived to be more credit worthy in comparison to SME's which is responsible for the SME lemon gap problem.

Micro firms like large firms also have an array of finance options to them including personal savings, bank loan, loans from public or private micro finance institutions, and cooperatives among others. The Financial needs of Micro firms are also micro in nature and are usually easily accessible by such classes of firm at a low interest rate and even without collateral. This is not the case with SME's, as they require more than micro loans and thereby may be required to provide collateral.

Except for the new trend of some commercial banks establishing SME units, SME's do not have specialized institutions focused on their peculiar finance needs. Commercial banks lend to SME's at similar rates that do give to large corporations, and sometimes even at higher rates due to the lemon gap problem. More so large firms have the leverage of economics of scale advantage thus reducing cost and increasing profitability which enables them to shoulder the burden of high interest rates.

Financial research on the effect of the global financial crisis has mainly concentrated on large firms, ignoring the small business sector. Small and medium-sized firms (SMEs), however, form an integral part of any modern economy, significantly contributing with innovations and employment in the world economies. Sustainability of the SME sector depends on the access to sufficient capitalization and is crucial for the recovery and revitalization of economies after monetary shocks. Before the global financial crisis SMEs were already facing multiple obstacles. The focus of this study is to evaluate if the effect of the Global crises on credit availability to SME's.

1.1 Conceptual Issues

The Bankers committee for the purpose of the SMEEIS (Small and Medium Enterprises Equity Investment Scheme) scheme, defines a small and medium enterprise as any enterprise with a maximum asset base of ₦1.5 billion (excluding land and working capital), and with no lower or upper limit of staff. Although other definitions exist, they are conflicting and are not stated as this study is not focused on solving the S.M.E. definition problem.

Many factors have been identified as likely contributing factors to the premature death. Key among this include 'insufficient capital, lack of focus, inadequate market research, over-concentration on one or two markets for finished products, lack of succession plan, inexperience, lack of proper book keeping, irregular power supply, infrastructural inadequacies (water, roads etc), lack of proper records or lack of any records at all, inability to separate business and family or personal finances, lack of business strategy, inability to distinguish between revenue and profit, inability to procure the right plant and machinery, inability to engage or employ the right caliber staff, cut-throat competition' (Basil 2005).

2. The Sme Finance Gap

SME finance gap is a problem that have been blamed on moral hazard issues, information asymmetry, all leading to the unwillingness of banks to lend to firms in the sector. Several studies attest to the impact of the global crises on banks. Our study shows that this further constrains the availability of credit to SME, as banks prefer to lend to large and micro enterprises than small and medium.

To solve the SME finance gap problem, the Bankers committee came up with the SMEEIS's in 2001 under which 10% of the profit after tax of Banks is reserved for SME financing. This has not had any observable effect on SME financing. As a result of the plethora of poor managerial cum low entrepreneurial skills, SMEs in Nigeria have not been able to maximally benefit from the equity. As at July 31, 2004, only about 30% of the N30 billion in that fund has been accessed by deserving SMEs. Many of the SMEs that applied for the SMEEIS fund did not even have a well-articulated business plan, not to talk of vision, mission, focus, management profile, financial projections and the rest of the pre-requisites for embarking on an enterprise development.

The top ten key problem areas facing SMEs generally in Nigeria in descending order of intensity include management problems, access to finance/capital, infrastructure, government policy inconsistency and bureaucracy, environmental factors related problems, multiple taxes and levies, access to modern technology, unfair competition, marketing problems and the non-availability of raw materials locally.

2.1 Banking Crisis Versus Financial Crisis

Financial crisis and banking crisis often go hand in hand; in some cases the words are synonymous, though banking crisis usually deals solely with events in the financial sector. In many instances, especially in recent history, banking crisis precedes the financial crisis. Often times it will be coupled with a currency or exchange crisis. Kaminsky & Reinhart (2009) as cited in Aldean (2009) 'described the beginning of a banking crisis by one of two events: (1) bank runs that lead to its closure, merging, or takeover by the public sector; and (2) if there are no runs, the closure, merging, takeover, or large-scale government assistance of a major institution'. Major changes in the landscape of the financial sector typically mark a banking crisis. We can often see a banking crisis develop in stages as described by Nakaso (2001), who describes four stages; '(1) market participants become reluctant to do business with troubled banks, resulting in higher risk premiums for those banks, and generally appearing 2-3 years in advance; (2) troubled financial news erupts, and the average maturity of deposits grows shorter; (3) retail depositors begin losing confidence in the banks, and a decline of "deposit surplus ration" is noticeable; and (4) liquid assets for sale are exhausted and the bank becomes insolvent'. This can happen over several years, and others in weeks or days, in the case of most bank runs (Aldean 2009).

2.2 Impact Of The Global Financial Crises On Nigerian Banks

The financial system is dominated by the banking sector (about 90% of the assets) and about 65% of market capitalization of the NSE (Soludo 2009). The Banking System o Tightening of liquidity due to net forex outflows and lower monetization of oil earnings o Further tightening of liquidity as lines of foreign credits enjoyed by Nigerian banks were called in. o Depression of the capital market and drop in the quality of part of the credit extended by banks for trading in the capital market (liquidity pressures as loans not fully serviced or repaid) o Greater loan-loss provisioning both due to capital market exposures and decline in growth of economic activities o Potential exchange rate risks on foreign lines due to depreciation of the exchange rate o Liquidity pressures push up domestic interest rates which if not addressed could pose systemic threat o Global credit crunch and re-pricing of risks push up interest rates on lines of credit for Nigerian banks o Slower growth rate of banks' balance sheet in response to the crisis and higher provisioning, leading to lower profitability.

2.3 Empirical Reviews

Empirical studies on the impact of global financial crisis on small and medium scale enterprise are few, while a large range of studies has been done on the impact of global financial crisis on other sectors of the economy. A number of relevant empirical facts from existing literature are reviewed below.
Yakubu A., Jagongo A, Almadi O.J., and Muktar B.S. (2014) in their study on the effects of the global liquidity crisis of 2008 that savings deposit increased at a diminishing rate, while cash request steadily increased during the period under study. Several studies assert that the inability of SMEs to obtain adequate funds is the major hindrance to their growth (Kauffman, 2008; Ayadi, 2008; Kremp and Philpon, 2008). 'They rely mainly on financial institutions for funds, and this over reliance on only one source for funding makes them vulnerable to external factors that might affect the banks' ability to lend' (Ogujiuba et al, 2004).
Beger and Udell (2001) have noted that negative changes to the economic environment, where the banks and SMEs operate can negatively affect the willingness and ability of banks to lend to them. According to World Bank estimates, the global economy contracted by 2. 1 % in 2009, the economy of the OECD area contracted by 4.7 % between the first quarter of 2008 and the second quarter of 2009, and government debt, within the area, rose to about 100% of the GDP (Sedej and Justinek, 2012). The rise in debt was because Governments borrowed more as a result of the crisis, to stimulate the economy. In most countries, the financial system and

the stock market were significantly affected by the crisis. Banks were particularly affected, especially those with off-shore credit lines (Ashamu andAbiola, 2012).

Between 2007 and 2008 the world witnessed a financial crisis comparable to the Great Depression of the 20[th]century. Since SMEs rely on financial institutions for funds, they were therefore, vulnerable to the impact of the downturn in the global economy, given that access to loans became increasingly stringent (Sedej and Justinek, 2012). Financial institutions found it increasingly difficult to lend and even had to recall credit lines, to improve their liquidity (Aluko, 2009).

In response to the situation, financial institutions resorted to the use of credit contraction to tighten lending standards (Komolafe, 2008). This led to the introduction of stricter lending requirements by banks and financial institutions (Soludo, 2009). As a result of the global financial crisis, many western banks reduced their financial investment in Nigeria in order to aid the parent organizations (Adamu, 2009), and international hedge funds and credit lines were withdrawn (Ashamu and Abiola, 2012). Also, 'banks with high foreign currency exposures were negatively affected, as they lost some financial assets deposited with foreign correspondent banks' (Adamu, 2009).

According to Aluko (2008), 'financial institutions in economically advanced countries reduced their investments in the Nigerian financial system, thereby causing the collapse of the stock market. Between 2002 and 2008, the stock market capitalization climbed to a high of N12.6 trillion'. However, by March 2009, the capitalization of the stock market had fallen to N4.5 trillion (Sanusi, 2011).The Nigerian capital market lost over N6 trillion in share value, with banking stock as one of the most affected (Offonago, 2008, cited in Okoroanyawu and Adesida, 2008).

According to Liu (2009), 'the global financial crisis had two big impacts on SMEs; the crisis resulted in a sharply decreasing external need for export-oriented SMEs; and more severe financial difficulties for all SMEs overall'. Soininen et al (20..) examined if Entrepreneurial Orientation (EO) affected the impact of global economic crisis on SME'S in Finny. It further investigated whether EO mitigated the negative effects of economic crisis both on firm's oper-ations and on firm's financial performance. Results based on a sample of almost 200 Finnish small and medium-sized enterprises indicated that the different dimensions of the EO can have diverging effects on how firms are treated by the recession. In general, the more innovative and proactive the firm is the less its operations are affected by the recession and the more risk taking the firm is the more its profitability is affected by the recession.

3. Methodology And Data Analysis

Both primary and secondary data were used for the study. Primary data collected in the course of this research study through the administration of questionnaires. Fifty questionnaires were issued out of which forty seven were completed while three were returned unfilled. The questionnaires were issued out to SME'S in the Lagos Ota area, which is a major commercial nerve center of Nigeria. Secondary data analysis is focused on the bank loans to the Small Scale sector due to the non-availability of data covering the Medium scale enterprises sub sector. Data were sourced from the CBN statistical bulletin.

4. Primary Data Analysis

In this section a quantitative presentation of the data gathered from the field is done, as well as the analyses of the responses retrieved and carry out appropriate statistical tests in order to test the relevant null hypothesis. This chapter is also concerned with analysis and presentation of the primary data and the secondary data.

4.1 ANALYSIS OF PERSONAL INFORMATION.

TABLE 4.2.1 FREQUENCY DISTRIBUTION OF THE RESPONDENTS BASED ON THE YEAR OF EXISTENCE

	Frequency	Percent	Cumulative Percent
0-5 Years	17	36.2	36.2
6-10 Years	22	46.8	83.0
11 Years & above	8	17.0	100.0
Total	47	100.0	

Source: Field Survey, 2014

The table above shows that 17 (36.2%) respondents agree that their businesses have been in existence between 0-5 years. Furthermore, 22 (46.8%) have been in the business between 6-10 years, while the remaining 8 (17.0%) have spent 11 years and above in the business.

TABLE 4.2.2 FREQUENCY DISTRIBUTION OF THE RESPONDENTS BASED ON THE MEANS OF FINANCING THE BUSINESS

	Frequency	Percent	Cumulative Percent
Bank loan	11	23.4	23.4
Cooperative	25	53.2	76.6
Family	7	14.9	91.5
Others	4	8.5	100.0
Total	47	100.0	

Source: Field Survey, 2014

It could be observed from the table above that 11 (23.4%) respondents are financing their businesses through the bank loan, 25 (53.2%) finance their business through cooperative, 7 (14.9%) respondents receive assistant from their family members, while the remaining 4 (8.5%) respondents are running the affairs of their businesses through other means.

TABLE 4.2.3 FREQUENCY DISTRIBUTION OF THE RESPONDENTS BASED ON THE TYPE OF BUSINESS

	Frequency	Percent	Cumulative Percent
Trading	27	57.4	57.4
Food & beverages	11	23.4	80.9
Manufacturing	3	6.4	87.2
Service	5	10.6	97.9
Others	1	2.1	100.0
Total	47	100.0	

Source: Field Survey, 2014

The table above shows that 27 (57.4%) respondents are engaged in trading business, 11 (23.4%) are in food and beverages, 3 (6.4%), 5 (10.6%) are rendering services, while the remaining 1 (2.1%) representing the number of people in the other business.

TABLE 4.2.4 FREQUENCY DISTRIBUTION OF THE RESPONDENTS BASED ON THE BUSINESS OWNERSHIP STRUCTURE

	Frequency	Percent	Cumulative Percent
Sole Proprietorship	33	70.2	70.2
Partnership	9	19.1	89.4
Others	5	10.6	100.0

Total	**47**	**100.0**	

Source: Field Survey, 2014

The tables above shows that 33 (70.2%) respondents are sole proprietors, 9 (19.1%) are partnerships, while the remaining 5 (10.6%) are others.

TABLE 4.2.5 FREQUENCY DISTRIBUTION OF RESPONDENTS BASED ON THE QUESTION DID FINANCIAL CRISIS AFFECT YOUR COMPANY

	Frequency	**Percent**	**Cumulative Percent**
Yes	**33**	**70.2**	**70.2**
No	**14**	**29.8**	**100.0**
Total	**47**	**100.0**	

Source: Field Survey, 2014

The table above shows that 33 (70.2%) respondents agreed that financial crises affect their business, while the remaining 14(29%) say no.

4.3 TESTING OF HYPOTHESIS USING CHI-SQUARE TEST HYPOTHESIS ONE

Table 4.3.1: THERE IS A SIGNIFICANT RELATIONSHIP BETWEEN THE POOR PERFORMANCE OF SMES AND THE GLOBAL FINANCIAL CRISIS

	Frequency	**Percent**	**Cumulative Percent**
Strongly Agree	**17**	**36.2**	**36.2**
Agree	**22**	**46.8**	**83.0**
Undecided	**2**	**4.3**	**87.2**
Disagree	**4**	**8.5**	**95.7**
Strongly Disagree	**2**	**4.3**	**100.0**
Total	**47**	**100.0**	

Source: Field Survey, 2014 based on question 5

STATEMENT OF HYPOTHESIS ONE

H0: There is no significant relationship between the poor performance of SMEs and the global financial

H1: There is a significant relationship between the poor performance of SMEs and the global financial

Table 4.3.2 COMPUTATIONS OF CHI-SQUARE TEST

	Observed N	Expected N	Residual
Strongly Agree	17	9.4	7.6
Agree	22	9.4	12.6
Undecided	2	9.4	-7.4
Disagree	4	9.4	-5.4
Strongly Disagree	2	9.4	-7.4
Total	47		

Table 4.3.3 Chi-square Test

N	Mean	Std. Deviation	Chi-square value	df	Critical value
47	1.9787	1.07318	37.787	4	9.488

Decision Rule

It could be observed from the table above that chi-square (X^2) calculated value is 37.787, while its critical value (table value) at 0.05 level of significance with 4 degree of freedom (df) is 9.488. Since the calculated value is greater than the critical value, thus null (**H$_0$**) hypothesis that says '**there is no significant relationship between the poor performance of SMEs and the global financial therefore is rejected**, while alternative hypothesis (**H$_1$)** is accepted. Hence, the test is statistically significant.

HYPOTHESIS TWO

4.3.4 GLOBAL FINANCIAL CRISIS HAS AFFECTED THE AVAILABILITY OF CREDIT TO YOUR COMPANY

	Frequency	Percent	Cumulative Percent
Strongly Agree	13	27.7	27.7
Agree	22	46.8	74.5
Undecided	4	8.5	83.0
Disagree	5	10.6	93.6
Strongly Disagree	3	6.4	100.0
Total	47	100.0	

Source: Field Survey, 2014 based on question 3

STATEMENT OF HYPOTHESIS TWO

H0: Financial crisis has no impact on the availability of credit to small scale enterprise.

H1: Financial crisis has impact on the availability of credit to small scale enterprise

Table 4.3.5 COMPUTATIONS OF CHI-SQUARE TEST

	Observed N	Expected N	Residual
Strongly Agree	13	9.4	3.6
Agree	22	9.4	12.6
Undecided	4	9.4	-5.4
Disagree	5	9.4	-4.4
Strongly Disagree	3	9.4	-6.4
Total	47		

Table 4.3.6 Chi-square Test

N	Mean	Std. Deviation	Chi-square value	Df	Critical value
47	2.2128	1.15976	27.787	4	9.488

Decision Rule

It could be observed from the table above that chi-square (X^2) calculated value is 27.787, while its critical value (table value) at 0.05 level of significance with 4 degree of freedom (df) is 9.488. Since the calculated value is greater than the critical value, thus null (**H$_0$**) hypothesis that says '**Financial crisis has no impact on availability of credit for small scale enterprise**' is rejected while alternative hypothesis (**H$_1$)** is accepted. Hence, the test is statistically significant.

5. Secondary Data Analysis

In the secondary data analysis, Loans to Small Scale enterprises (LTSSE), while the independent variables include Prime Interest rate, exchange rate… Being that the aim of the study is to evaluate the impact of the crisis on credit availability to SME's, LTSSE can be used to represent credit availability to the sector. In the micro economic parlance, interest rate impacts on both the demand and supply for/of loans. A lower interest rate theoretical spurs higher demand for loans while a higher interest rate will spur lower demand for loans and higher supply. From literature on SME financing, this case may be the reverse due to the credit rationing behavior of banks to SME's. Bank are only willing to lend to SME's that are perceived risky (Lemon gap) on a higher interest rate which could further lead to the adverse selection problem. We expect therefore expect a positive relationship between and interest rate and LTSSE at variance with traditional theory on interest rates and loan able funds.

Descriptive Statistics

Table 1. Global Purchasing Power Parity Growth Rates
PPP economic growth rates (%)[3][4][5][6][7][8]

Region	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 (est.)
World average	5.1	5.2	3.0	-0.5	5.3	3.9	3.2	2.9	3.3	3.5
Advanced economies	3.0	2.7	0.6	-3.4	3.2	1.7	1.5	1.2	1.8	2.4
Eurozone	2.9	2.7	0.7	-4.1	1.9	1.5	-0.6	-0.4	0.8	1.2
USA	2.7	2.1	0.4	-2.6	3.0	1.8	2.8	1.9	2.2	3.6
Developing countries	7.9	8.3	6.0	2.8	7.5	6.2	4.9	4.5	4.4	4.3

Source: IMF

The Impact of the global crises is seen in the trend of data on global PPP economic growth rates, with the rates of various economies receding in 2007, with more recession observed in the US where the crises originated, except for developing countries and the world average. This clearly shows the impact of the crises. 2008 saw all the growth rate indices declining while 2009 saw all the indices further plunging to negative values except that of developing countries.

Figure.1 Trend Movement of NASDAQ

NASDAQ
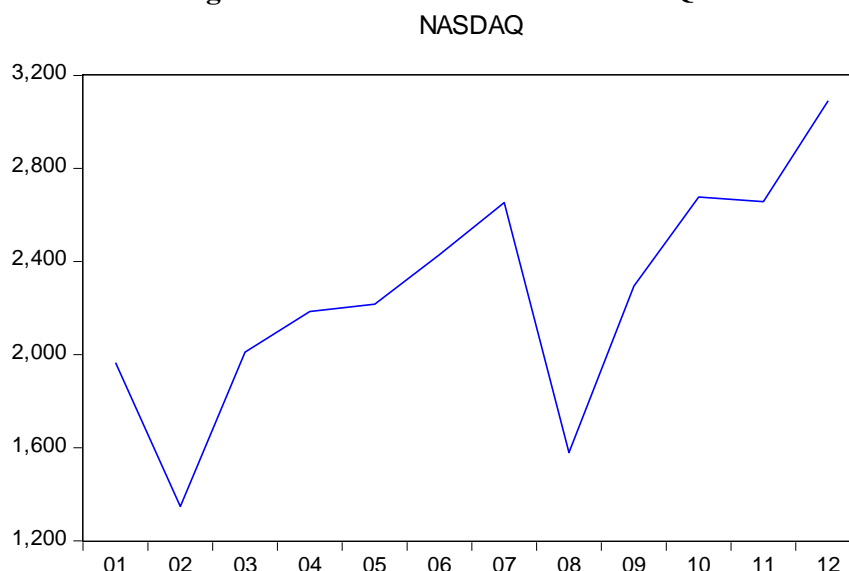
The graph above shows the effect of the global crises on prices of securities listed on the US stock market. The drop in the index in 2008 coincides with the decline experienced in the data on LTSSE, interest rate and exchange rate as shown in the graph below.

Figure 2   LTSSE, prime Interest rate and exchange rate and Inflation rate.
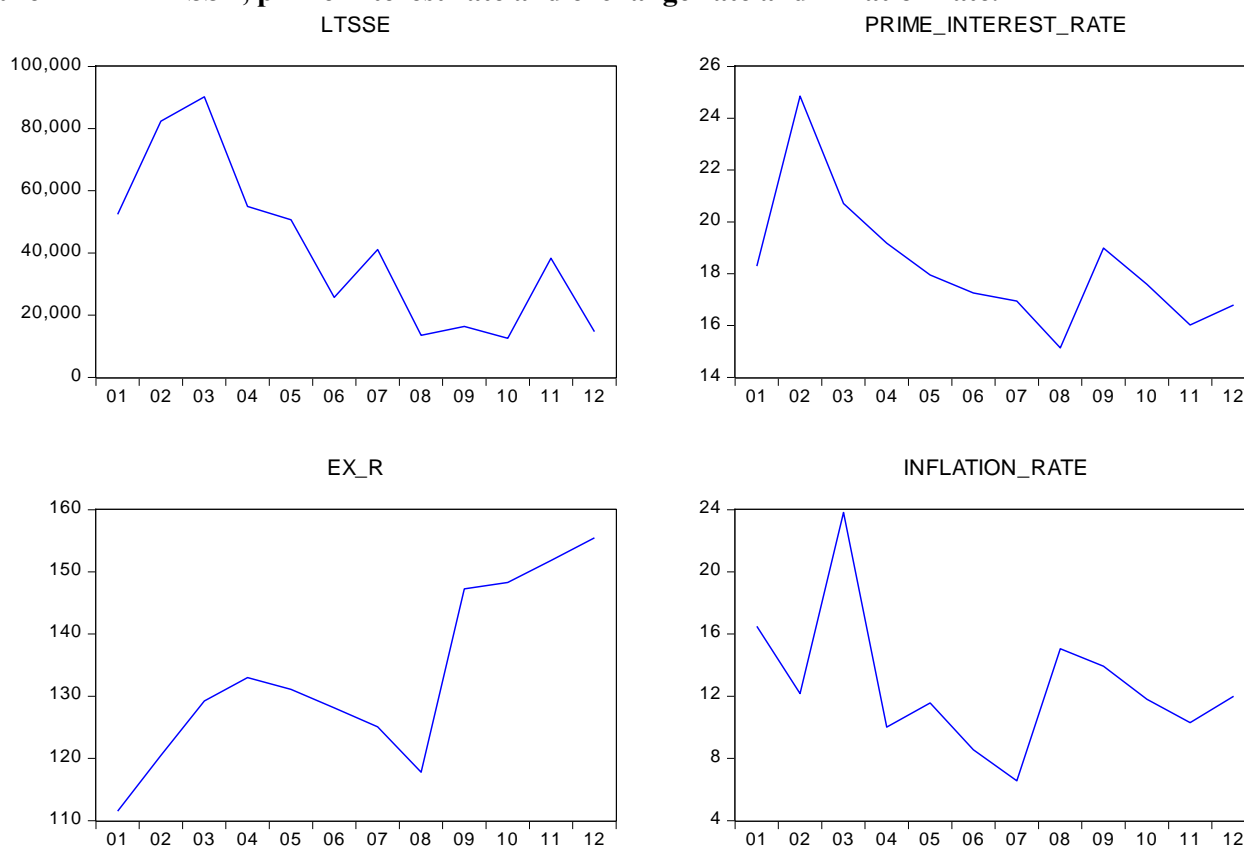
The graph clearly shows that the all the variable where visibly impacted by the global crises in 2007 and 2008, with all the variables experiencing a significant drop in with the period of the crises. Data from the CBN statistical bulletin shows that loans to small scale industries was reducing year on year from 90178.5 in 2003 to a low of 25713 in 2006, though there was an increase in the total loan to the private sector. The amount of LSSE surged up temporally in 2007 but slump thereafter to an all time low amount of13512.2 in 2008 which can be attributed to the effect of the crises. Knowing that banks lend more to large enterprises, followed by medium and then small enterprises could account for the reason why a continuous increase in loans to the private sector did not translate to an increase in loans to small scale enterprises, this was further worsened by the crises.

The recapitalization of commercial banks in 2005 repositioned and put them in a better shape to perform their role of financial intermediation. Most banks rather invested in shares and FOREX speculation rather lend to the Small scale enterprises. Banks total exposure to Capital market as at end January 2009 was N784 billion or 10% of total Loans (C.A.M.L 2009). Interest rate fluctuated with the LTSSE as it reduced to 15.4 in 2008 and increased to 18.99 in 2009 maintaining an average of 16.8% for the following three years thereafter.

 Ratio of Loans to SSE's to Total credit to private sector reduce year on year from 8,68% in 2002 to o. 85 %, 0.17, and 0.14 in 2007, 2009 and 2010 respectively. Though total credit from commercial banks to the private sector increased by 61.79% in 2008 23.96% in 2009 credit to the SSE sector reduced by -67.12% in 2008 and merely in increased by 21.12% from the 2008 figure, while plummeting by -23.31% in 2010.

6. Econometric Model

The linear regression model for the study

LTSSE= f (INT-R,INF-R,EXCH-R,NASDAQ)

LTSSE= Loan to Small Scale Enterprises

INT-R = Prime Lending Rate

EXCH-R =Exchange rate

NASDAQ= National Association of Securities Dealers Automated Quotations

Loan to small scale enterprises show the amount of loans that commercial banks lend to small scale enterprises. LTSSE is a fraction of total loans to the private sector. Commercial bank loans are the major external sources of funds to small scale enterprises. Exchange rate is one of the transmission channel through which the global crises impacted on the Nigerian economy as a whole and particularly the banking sector and the stock market as most banks were involved in FOREX trading directly or indirectly. Exchange rate changes are linked to inflation rate which captures the changes in prices of goods and services in an economy. The most obvious marker of a potential financial crisis to come in developed countries is a downturn in equity markets. Therefore the NASDAQ index was used to represent the global equity market.

$LTSSE= \beta_0 + \beta_1 INT\text{-}R + \beta_2 INF\text{-}R + \beta_3 EXCH\text{-}R + \beta_4 NASDAQ + u$

Econometric Analysis Of Secondary Data

Table 2: Regression Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PRIME_INTEREST_RATE	6743.590	1926.920	3.499674	0.0081
INFLATION_RATE	1365.959	1272.865	1.073137	0.3145
EX_R	-1033.271	546.9393	-1.889188	0.0955
NASDAQ	16.90069	20.05995	0.842509	0.4240
R-squared	0.686677	Mean dependent var	41074.28	
Adjusted R-squared	0.569181	S.D. dependent var	26377.63	

The empirical analysis shows that both interest rate and exchange rate could explain variations in the amount of LTSSE the independent variables of the model determines LTSSE. The result from the analysis shows that there is a positive relationship between Prime Interest Rate and LTSSE. Prime Interest rate was Significant at the 1% level of significance, with a coefficient of 6743.590, and R^2 of 69% implying that about 69% of changes in LTSSE can be explained by the model. In the line of traditional economic theory one would expect a negative relationship between Prime interest rate and LTSSE. This result the other hand shows the credit rationing behavior of Banks to SME, where Banks only lend to perceived risky SME's at a higher interest rates. This behavior further makes it more difficult for SME's to it apply for, receive and repay back loans. Exchange rate was significant at the 10% level of significance.

Further more the result showed that Inflation rate, and NASDAQ index were positive but not significant in the model. This also implied that with higher rate of inflation and higher global stock prices there is an increase in lending to the small scale sector and vice versa. This can be attributed to the challenges SME's face in acquiring finance, including credit rationing, the SME finance gap, information asymmetry amongst others as stated in the　　　literature

7. Conclusion And Recommendation

The findings from the study show that the global crises affect the availability of credit to SME and as such the performance of SME. Though the secondary data showed that interest rate was low in 2008, credit to small

scale enterprises was also low, and an increase in interest rate was accompanied by an increase in the availability of credit to the small scale enterprises sector. This shows that the global crises worsened the credit rationing behavior of banks to SME's in Nigeria. The result from the primary data analysis confirmed that beyond the impact of the crises on availability of credit, the performance of SME's was also affected.

From the foregoing, government and regulatory bodies need to do more to eliminate the lemon gap problem faced by SMEs, by creating a platform for the operation of credit rating agencies in Nigeria. Also all commercial banks should be encouraged to have SME units with staff trained on SME financing. Also The CBN needs to regulate interest rates given to the SME sector to ensure that they are lower than those given to large scale businesses. This will foster their ability to receive and pay back loans and further ensure their survival and growth. Lastly it is important for regulators of the financial system to ensure the availability of credit to the sector is sustained even during periods of financial crises as the availability of credit to the sector is of great importance to the economy at large.

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APPENDIX
Dependent Variable: LTSSE

Method: Least Squares
Date: 04/12/15   Time: 11:27
Sample: 2001 2012
Included observations: 12

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PRIME_INTEREST_R ATE	6743.590	1926.920	3.499674	0.0081
INFLATION_RATE	1365.959	1272.865	1.073137	0.3145
EX_R	-1033.271	546.9393	-1.889188	0.0955
NASDAQ	16.90069	20.05995	0.842509	0.4240

R-squared	0.686677	Mean dependent var	41074.28
Adjusted R-squared	0.569181	S.D. dependent var	26377.63
S.E. of regression	17313.44	Akaike info criterion	22.61756
Sum squared resid	2.40E+09	Schwarz criterion	22.77919
Log likelihood	-131.7053	Hannan-Quinn criter.	22.55771
Durbin-Watson stat	1.857422		

Overview and Assessment of Unity Toolkits for Cave Automatic Virtual Environments and Wand Interaction

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Abstract

As the interest in Virtual Reality (VR) increases, so does the number of software toolkits available for various VR applications. Given that more games are being made with the Unity game engine than any other game technology, several of these toolkits are developed to be directly imported into Unity. A feature and interaction comparison of the toolkits is needed by Unity developers to properly suit one for a specific application. This paper presents an overview and comparison of three virtual reality toolkits available for developers using the Unity game engine. getReal3D, MiddleVR, and Reality-based User Interface System (RUIS) are analysed for VR interaction and display on multi-projection immersive environments like Cave Automatic Virtual Environments (CAVE)s. MiddleVR was found to have the highest performance and most versatile toolkit for CAVE display and interaction. However, taking cost into account, RUIS has an advantage as it is available for free under the Lesser General Public License (LGPL) Version 3 license.

1. Introduction

Virtual reality technology gives users the ability to interact with three-dimensional data, providing an interface that is potentially powerful to both static and dynamic information [1]. A key ingredient of a VR experience is interaction with a virtual world [2]. For human-computer interaction the most exciting, well-engineered, and commercially successful application of direct-manipulation interfaces lies in the world of video games [3]. Having over 45% of the global game engine market share, the Unity engine is the dominant global game development software, resulting in more games being made with Unity than with any other game technology [4]. Various VR application toolkits are available for the Unity game engine, and each has a unique set of features. There are several different approaches for interactions with input devices and displays. Before beginning this study, several questions had to be answered to get an idea of how to go about analyzing the toolkits. Questions such as: "What features should you look for when evaluating a toolkit?" and "Which toolkits are better suited for relevant interaction and display applications?"

A literature review was initially conducted to find out how other VR toolkits are being assessed. Performance, flexibility, and ease of use are figures of merit used to compare or assess different VR development applications[5]. Differences found when comparing VR platforms included: complexity, parallel decomposition, object implementation, and object control and interaction [6].Regarding interaction styles in development tools for VR applications, it was found that options available for design of interaction styles have been denoted as: command language, menu selection, form filling, and direct manipulation[7]. For Virtual Reality Aided Design (VRAD), a study was conducted regarding the ability of various VR tools for pointing, picking and line sketching[8]. Several advantages VRAD has against 2D CAD tools were listed as stereo vision, spatial input, six DOF, heat tracking, mixed reality, tangible interfaces, and interaction freedom[8]. To interact with objects in 3D virtual environments, hand-gesture-based user interface could potentially be employed in place of a mouse or keyboard [9]. With several interaction techniques available for

selection and manipulating objects, the choice is dependent on the characteristics of the application [10]. The ray casting technique, referred to as wand interaction in this study, projects a ray into the direction that the user points to select and manipulate objects.

This report analyzes the getReal3D, MiddleVR, and RUIS toolkits and looks specifically at CAVE display and wand interaction. An overview for each toolkit is initially given followed by CAVE display, interaction, and steps to implement applications with the toolkit in Unity. Following the explanation of each toolkit, comparative analysis is given with a rubric system measuring different strengths and weakness of each toolkit. The CAVE display used for the study is the 3-sided CAVE in the Rougeou Hall VR lab at the University of Louisiana at Lafayette shown in *Figure 1*. One computer was used with multiple graphics cards capable of running the three projectors and desktop display simultaneously. For the comparative analysis, an interaction test bed task is made of an alternative energy technician who must remove the doors of an Electrotherm Green Machine to view the internal components. A direct comparison of the toolkits regarding interaction is not possible because they do not all support the same interaction devices. All the toolkits have a wand interaction which is used for configuring the scene. Due to obvious differences in interaction devices, trying to compare a given task with different ones would not be feasible. However, MiddleVR and RUIS both support the Razer Hydra therefore this device will be used for the interaction testbed scene. This is an assessment of what these toolkits provide.

Figure 1: 3-sided CAVE in Rougeou Hall VR lab at the Univesity of Louisiana, Lafayette.

2. Methodology

To properly assess the current, early 2015, toolkits and compare relevant tasks the following methodology was created:

1. Technology review for Unity VR toolkits and interaction devices
2. Survey key features for relevant tools and select ones to compare
3. Create Unity testbed scene with relevant interaction tasks
4. Install tool kits and assess key performance measures
5. Create rubric system for comparison
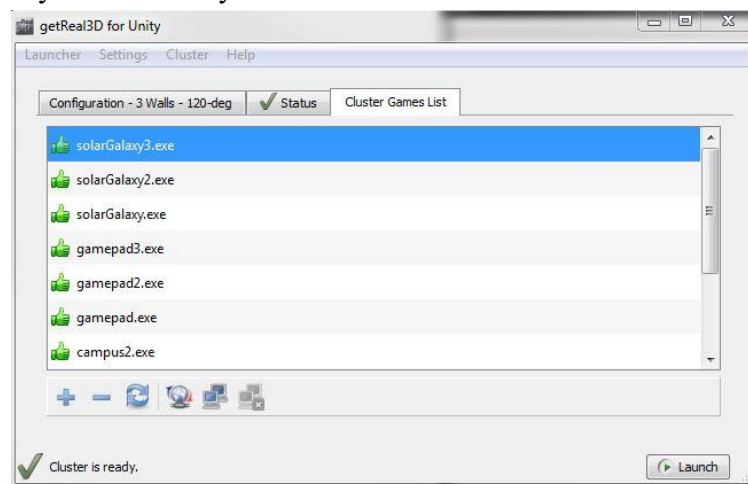
3. getReal3D

3.1 Overview

Aimed at 3D immersive environments for more realistic training and simulation scenarios, Mechdyne Corporation released getReal3D as a Unity toolkit that brings 3D and viewer-based perspective to a variety of

immersive 3D displays. The toolkit supports stereo 3D, multiple video channels, viewer-centric perspective (head tracking), and tracked interaction.

The main components of the getReal3D toolkit are the configuration file, daemon, launcher, and plugin. The configuration file contains the display system, hardware, input devices, and many other settings that define how and where games will run. The getReal3D daemon must always be running on the workstation on which the game is running on. The launcher, shown in *Figure 2,* allows the user to run and deploy Unity games and consists of three sections: configuration, status, and games [11]. Finally the plugin is embedded inside the Unity project to provide run-time VR behaviors [12]. The getReal3D prefab also includes a skybox prefab to correctly display CAVE skyboxes in Unity.

Figure 2: The getReal3D launcher interface.

3.2   CAVE display

Games created within the Unity game engine can run in multiple virtual reality environments using the getReal3D toolkit. Given the VR-specific data for a particular VR device, the toolkit generates the necessary cameras for the desired display system. This camera configuration allows multi-view, the ability to synchronize game state, where a single Unity games state is synchronized across multiple running instances [12]. Although not used in this study, the getRealCameraUpdater.cs script provided can be used to create a viewable application in a 72 display CAVE2 [13].

3.3   Interaction

The getReal3D toolkit uses user-center perspective where the game view will be in the perspective of a tracked user inside the VR environment.   The software comes with the "trackd" package, which is a combination of trackd Server and trackd Daemon. The trackd Server is started to open a connection to tracker and/or controller devices and sends the data to a trackd Daemon that collects and stores the data in shared memory. For different interaction devices, shown in *Table 1,* the user must load the required configuration files for trackd.conf and trackdserver.conf. The tracker and controller input must be configured in these files.

Table 1: trackd Supported Devices [14].

Tracker Systems	Input Controllers
3D-Bird™	CubicMouse™
FASTRAK®	FlyBox
Flock of Birds®	Intersense Wand
InterSense IS600	NeoWand™
InterSense IS900	PINCH® Gloves
Is_Trackers (generic	
support for Intersense)	SpaceBall 3003
laserBIRD®	SpaceBall 4000
MotionStar®	SpaceBall 5000
pcBIRD®	SpaceOrb
SpacePad®	SpaceGrips™
OptiTrack™	V-Wand™
PPT™	Wand™
	Wanda™
	WorkWand™
	USB Gamepads
	FlyStick2
	Wiimote and Nunchuck

In order to run the game in the editor, the user needs to start the trackd simulator shown in _Figure 3_. The trackd simulator provides a GUI with head/hand sensors, joystick valuators, and buttons which are needed to navigate and manipulate objects in the Unity editor.
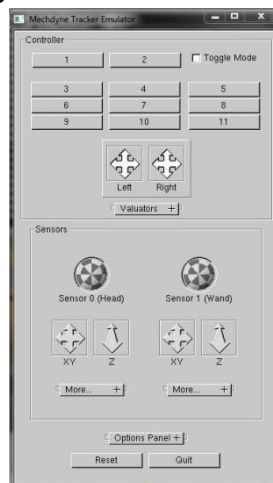
Figure 3: The trackd Simulator.

3.4   Using getReal3D in Unity

The steps required to create, navigate, and manipulate a Unity scene in a CAVE display are given below. The getReal3D developer license is required to use the getReal3D launcher to test cluster synchronization. To run the current getReal3D version 3.01 tool kit, Windows 7, DirectX 11, and Unity 4.5 with a Pro license are needed. To start with the getReal3D toolkit, the user must import the custom package into Unity and add the required prefabs into the Unity scene. This will create a first person, head centered, perspective with standard navigation.

1)   Open or restart Unity 3D and import the getReal3D toolkit into the scene

> ▪ The user must not play the scene inside the editor before importing the package or the import will fail to update the core plugin (gr_plugin.dll).

2) Drag the getRealPlayerController.prefab into the Unity scene to desired start position.
> ▪ This comes with controller scripts and three objects, Hand, Head, and Main Camera. This is a first person view.

3) Drag the WandManger.prefab to the Hand object
> ▪ Contains three objects, CollidingWand, GrabbingWand, and PointingWand, with interaction scripts.

4) Delete or disable any Camera objects in the scene.
> ▪ getReal3D manages all the VR cameras.

5) Add a Collider, Box or Mesh, and Rigidbody to all objects to be interacted within the scene.

6) Click menu item getReal3D – Scene Checker
> ▪ This will open a window to show the status of the current scene and give suggestions for remaining steps to run on getReal3D cluster.

7) Start trackd simulator
> ▪ This provides a GUI with head/hand sensors, joystick valuators, and buttons, which is needed to navigate and manipulate objects in the Unity editor

8) Press play to test scene in Unity editor
> ▪ For navigation and object manipulation, use mouse to interact with Mechdyne Tracker Emulator. Press 2 to change wand type.

9) Build executable
> ▪ Player settings automatically configured:
>> i. Default Is Full Screen : Off
>> ii. Run In Background : On
>> iii. Capture Single Screen : Off
>> iv. Display Resolution Dialog : Hidden By Default
>> v. Use Player Log : On
>> vi. Resizable Window : On
>> vii. Force Single Instance : Off

10) Start getReal3D for Unity
> ▪ Games including the getReal3D for Unity plugin will only run from the getReal3D launcher.

11) Place preconfigured configuration file in the getReal3D for Unity 3DConfigs folder.
> ▪ This is made by getReal3D after giving computer hardware, projector and screen specifications, and layout configuration.

12) Click on configuration tab and select configuration.

13) Click on Cluster Games List and add the Unity game executable.

14) Select Left display as primary display.

15) Click Launch.

The game should appear on the CAVE display and is controllable by a USB gamepad remote. Using Xbox remote, the user navigates with the left analog stick, jumps by pressing Y and changes wand type by pressing B. If GrabbingWand, or the blue wand is selected, user presses A to grab objects. This remote is not tracked but was the only supported gaming remote available for this study.
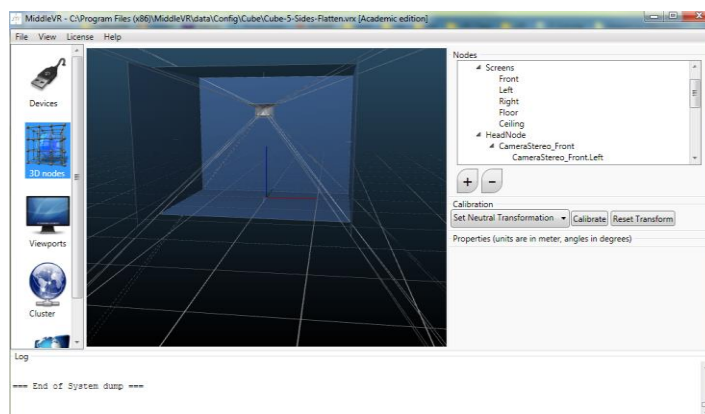
4. MiddleVR

4.1 Overview

MiddleVR is VR middleware that simplifies the creation and deployment of VR applications and is adaptable to many different VR hardware and 3D applications[15]. MiddleVR supports many VR systems including CAVE, immersive Cube, Holostage, Holobench, workbench, Powerwall, Head-mounted displays, 3D TVs, and zSpace using popular interaction devices such as Kinect, Razer Hydra, and Leap. A full list of supported devices is given in *Table 2*.

Table 2: Interaction Devices supported by MiddleVR [15]**.**

Kinect (v1 & v2)
Oculus Rift (DK1 & DK2)
Leap Motion (SDK 1 & SDK 2)
TrackIR
Razer Hydra
Vuzix Tracker
SpacePoint Fusion
SpaceMouse
Intersense IS-900
A.R.T native driver
Vicon native driver
Optitrack native driver
Colibri
Organic Motion's Markerless Mocap
VRPN (Vicon, ART, Optitrack, Intersense…)
Haption's haptic devices

4.2   CAVE display

MiddleVR offers predefined configurations for 5-sided CAVEs, either with viewports displayed on one computer or with 5 computers in a cluster. *Figure 4* shows the configurator tool with a 5-sided CAVE configuration. An unlimited amount of display configurations can also be set up in the MiddleVR configurator.

Figure 4: A 5 sided CAVE configuration with stereo cameras.

 MiddleVR also offers predefined-configurations with set cameras, screens and viewports for several HMD devices including: Oculus Rift (DK1, DK2), NVIS-SX60, NVIS-SX111, Sony-HMZ-T1, Vuzix VR 920, and Vuzix Wrap 1200VR.

4.3   Interaction

The VRManager prefab has a VRMenu and VRWand as child objects. To use the VRWand to interact with things, the objects must have a VRActor script attached to it. Once the wand intersects with an object with this script attached, it will change color. The object is then grabbable and can be picked up by pressing a controller

button and released by letting go of the button. The device manager holds the reference to all declared devices. When programming to get access to trackers' data, or the state of a joystick, initially a reference must be made of the corresponding object to the device manager [15].

4.4   Using MiddleVR in Unity

The steps to create a navigation and manipulation Unity scene in a CAVE display are shown below. After installing MiddleVR, either a Pro or Academic license is needed for output on several viewports such as a CAVE system. A 30-day trial is available to test the system with the MiddleVR toolkit. The trial version was used for this study. MiddleVR help files include a user guide, tutorial, and forum. The basic MiddleVR workflow is to create a description of the VR system in the configurator, which will output a configuration file that will configure the 3D application to match this description. The description includes all devices, trackers, physical screens and cameras used in the specific VR environment. Below is a condensed step-by-step version.

1) Import the MiddleVR package into the Unity scene
   - Package located by default at C:\Program Files (x86)\MiddleVR\data
2) Drag the VRManager prefab into the Hierarchy or directly into the scene
   - The VRManager has a VRMenu and VRWand as child objects with different options that can be configured in the Inspector.
3) Open MiddleVR configuration tool to create the desired VR system configuration.
   - For preconfigured configurations, click on the Simulations window and select from configuration list.
4) Go to the Devices window and add a device from the list. The Tracker Simulator – Mouse in the device window, shown in Figure *6a,* can be used to create a fake 3D tracker for testing purposes.
5) Go to 3D nodes window and add screens, cameras, and trackers to match the user's system. *Figure 6b* is the 3D node setup of the three sided CAVE system used for this study.
6) Go to Viewports and add the viewports ports position and resolution for the VR system. *Figure 6c* is the Viewport setup of the three sided CAVE system used for this study.
7) Save the configuration file and add the configuration file extension to the Unity editor Config File place holder in the Inspector for the VRManager.
8) Test the scene in the Unity Editor. The scene in the Unity editor can be tested, however if the viewport the user has defined in MiddleVR is different from the Unity editor in terms of aspect ratio, the view will appear distorted.
9) Build the scene in Unity. After dragging the VRManager to the Hierarchy, the player setting should set automatically, but to make sure refer to *Figure 7* for the correct settings.
10) There are two ways to run the application
   - Execute the .exe file that was created when building the game. This will use the VR configuration file that is specified in the VRManager.
   - Run the .exe file through the Simulations window in the MiddleVR configurator. This allows the user to select the VR system to use at runtime. The user can easily change the interaction controller or display configuration and run a simulation.

Getting the VRManager containing the camera, menu, and wand to appear where desired is not straight forward. Unlike other Unity objects, it does not matter where the user drags the VRManager object in the scene. A new VRManager object is created once the play button is pressed that has no relation to the actual object in the scene view. To fix this, create a GameObject UserNode and place it in the desired starting position and set this node as the VRSystemCenter in the VRManager properties. This way, when MiddleVR

will create the GameObjects corresponding to the set configuration's 3D Nodes, it will use this GameObject as the VRSystemCenterNode.

a)

b)

c)

d)
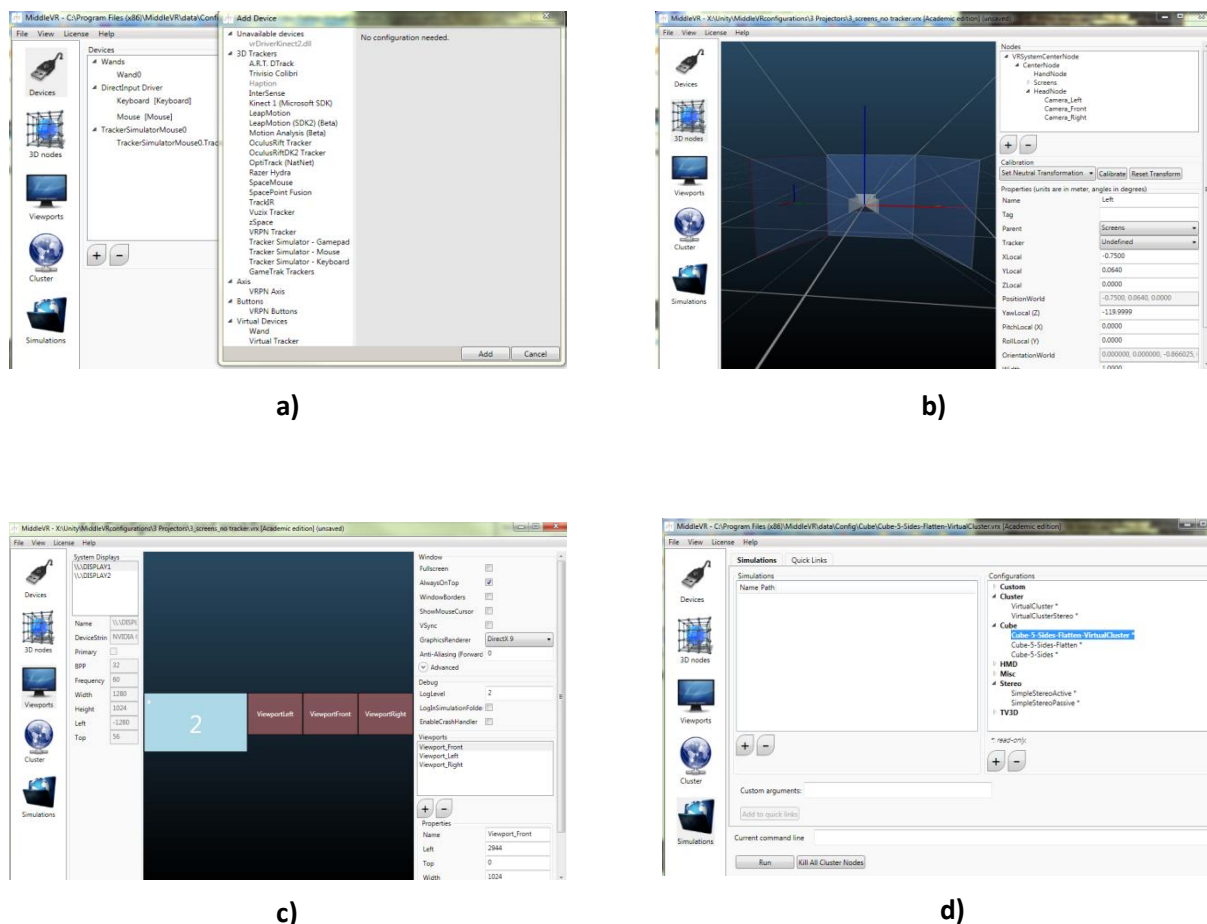
Figure 5: MiddleVR Configurator. a) Devices. b) 3D Node. c) Viewport. d) Simulation.

The different windows available in the MiddleVR configurator are shown in *Figure 6*. There is also a Cluster window where a server and clients can be added for clustered VR configurations.
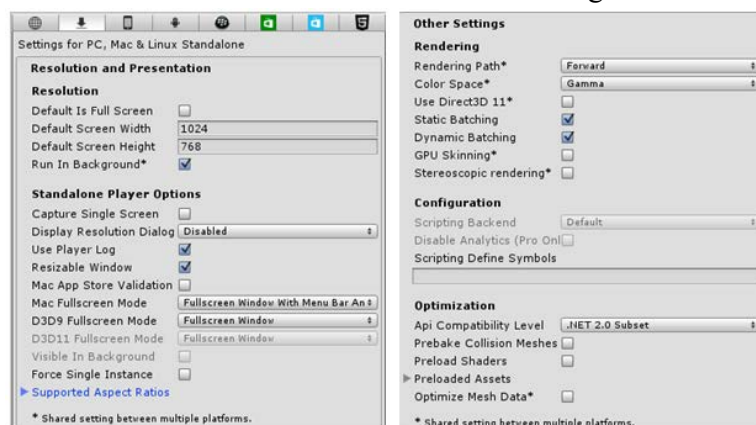
Figure 6: Player settings in Unity for MiddleVR.

Figure 7 shows the player settings for using the MiddleVR toolkit in Unity. To make sure that Unity does not override the MiddlerVR's window configuration, the default of full screen must be unchecked and display resolution dialog must be disabled. If active stereo with OpenGL Quad-Buffer is being used, then the VSync must be deactivated in the Quality settings window.

5. Reality-based User Interface System (RUIS)

5.1   Overview

Reality-based User Interface System (RUIS) is an open source toolkit for creating virtual reality and motion controlled applications, incorporating several interaction devices directly into the Unity scene [16]. These include a display manager for handling several display devices easily added within the Unity editor. RUIS supports the use of Kinect 2, Oculus Rift DK2, and PlayStation Move together in the same coordinate system[17].

5.2   CAVE display

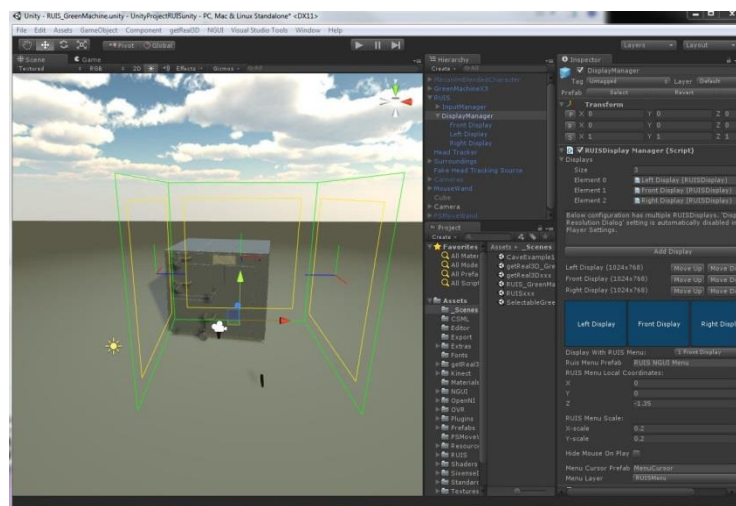The RUIS prefab has a display manager for a three sided cave consisting of a front, left, and right display. More displays can easily be added but unlike getReal3D and MiddleVR, no top and bottom displays can be used. *Figure 8* shows the Unity DisplayManager interface.

Figure 7: RUIS DisplayManager interface.

Head tracking can be achieved by selecting the desired tracker in Unity. The options are Kinect (1,2), Oculus Rift DK2, PS Move, Razer Hydra, or Input Transform. Keystone correction can be applied to projection walls while the scene is running. To access, click ESC-key to bring up the RUIS menu, and then click Display Management and drag the viewport corners. The user must temporarily disable the Head Tracker or mouse clicks will not respond when attempting to apply keystone correction.

5.3   Interaction

For interacting with the scene, RUIS offers several different wand prefabs including mouse, PSMove, RazerHydra, and Skeleton(Kinect). To interact with an object, the object must have a collider and a RUISSelectable script attached to it. Objects can be picked up and moved anywhere in the scene with the wand controller. The objects will highlight when the wand is positioned for interaction and once the main trigger button is pressed the objects will be picked up and held onto until the trigger is released. SkeletonWand is different from the other wands as it uses the selection gestures hold and fist. RUIS offers many other interaction scripts for wand interaction including ball and hinge joints. The newest version of RUIS offers avatar joint filtering and a fist gesture that can be used to grab and manipulate objects using the Kinect v2.

5.4   Using RUIS in Unity

A project folder with all RUIS scripts, example scenes, layers, etc. is available for download on the blog.ruisystem.net website. To get the scene running with the RUIS system, either create a package and import it into RUIS, or create a package in RUIS and import it into the scene and add the needed layers and script execution order. *Figure 8* shows the layers that need to be added to the Unity scene and the script execution order that will need to be set up.
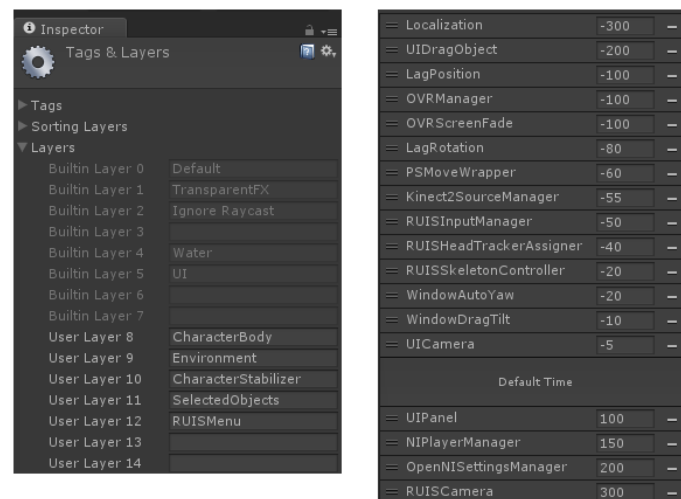
Figure 8: RUIS layers and script execution order[16]

The easiest and quickest way to use the RUIS toolkit is to import the package into the RUIS project folder. The following steps assume the user is using the RUIS project folder with the scene imported.
1) Import the desired package into RUIS project folder and drag into new scene
2) Drag the RUIS prefab into Hierarchy, which includes a display and input manager.
3) Drag the RUISCamera for each display into Hierarchy.
4) Drag the desired interaction wand prefab
    a.   Wand options are Mouse, PSMove, RazerHydra, and Skeleton(Kinect).
5) Click on InputManager in the Hierarchy and set the desired input device.
    a.   If using PSMove the IP and Port of the PS3 must also be set. The IP need to be set in the PSMoveWrapper as well.
6) Click on DisplayManager in the Hierarchy and configure Display properties such as number of displays and corresponding position and resolution.
7) Drag HeatTrackers prefab to the scene to set up head tracking
    a.   Options are Kinect(1,2), OculusDK2, PSMove, RazerHydra, MobileRazerHead, and RotationOnly.
8) Add colliders and RUISSelectable script to objects to be manipulated.
9) Test scene in Unity.
    a.   By pressing play button tracking and controller can be tested in Unity. This is helpful in configuring the controller position.
10) Build executable
11) Drag executable to cover CAVE walls.
    a.   The built executable will have a vertical line showing the division between screens.

6.   Other toolkits

6.1   VRUI VR toolkit

This toolkit aims to support many applications that run on a range of VR environments with several input devices such as Kinect and Wiimote and run in multiple displays such as CAVE and the Oculus Rift. The toolkit offers support for multiple Kinects to facilitate a 3D video stream to other existing VRUI VR applications[18]. Although VRUI seems promising, it is not a Unity tool and is Linux-based, therefore it was not used for analysis for this study.

6.2 Unity Indie VRPN Adapter (UIVA)

UIVA is socket-based middleware to adapt VRPN to the Windows version of Unity 3D. It works with the Indie version of Unity 3D and is open source under the same license of VRPN. UIVA supports Microsoft Kinect, Nintendo WiiMote, Nintendo Wii Fit balance board, Wireless-T BPack accelerometer, General mouse, SpacePoint Fusion sensor (version 1.01), PhaseSpace optical motion capture system (version 1.02) [19].

UIVA consists of a server side and a client side. The basic concept and data circulation can be shown in *Figure 10.* The client side is a DLL file residing in Unity3D and the server side contains a VRPN client to talk to the VRPN server.
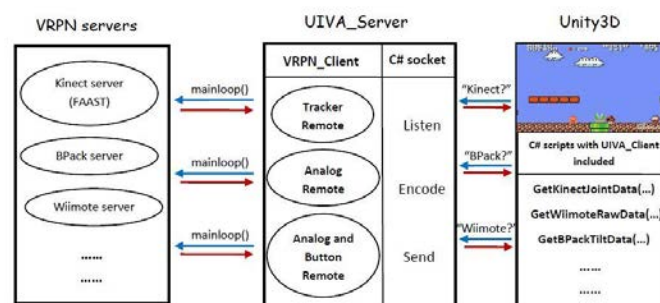
Figure 9: UIVA data circulation [20]**.**

To pair devices to the machine the following steps are needed.

1) Start their VRPN servers
2) Setup UIVA_Server.cfg and run UIVA_Server.exe
3) Copy Uiva.dll to the Unity game Asset folder
4) Write C# scripts to request data in Update() [20]

This toolkit does not offer any prebuilt Unity package or project folder and cannot be quickly implemented into the Unity scene therefore was not analyzed in this study.

7. Comparisons and Analysis

7.1 CAVE display Comparison

Regarding configuration, MiddleVR has an external application where the viewports, nodes, cameras, trackers, etc. can be configured and the output is a configuration file that can be put in the Unity scene. With getReal3D, the configuration file is created by the support team with the user's specific VR system information. This process is timely and allows less freedom for configuring VR devices. RUIS toolkit has the quickest and fastest setup for a three-sided CAVE. However, unlike MiddleVR and getReal3D, RUIS does not allow top and bottom displays.

7.2 Interaction Comparison

In MiddleVr, to make an object interactable, a VRActor script and a collider must be added to it. The object can then be manipulated by grabbing with the wand, rotating it and setting it aside. Objects will return to their initial position after a set amount of time if the Manipulation Return Objects script is selected. This can be helpful in dissembling and reassembling complex objects such as the Green Machine shown in *Figure 11*. MiddleVR has several more built-in interaction options than the other toolkits such as the Gogo hand to reach far away objects.
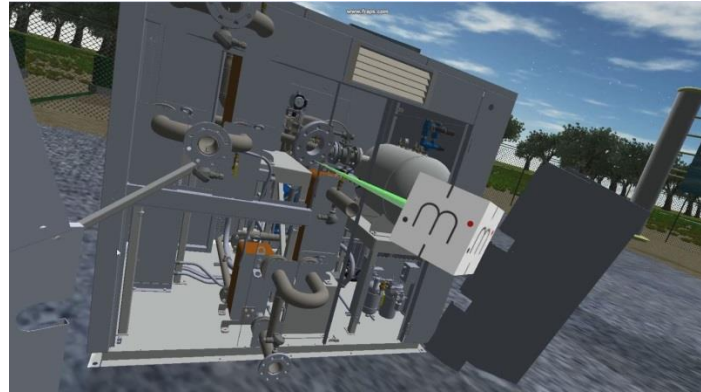
Figure 10: Dismantling the Green Machine with the MiddleVR toolkit in Unity.

In getReal3D, objects do not need any script to be manipulated. The objects need to have a rigidbody in addition to a collider attached to each object. The three given manipulation methods in the getReal3D toolkit are point, collide, and grab.

RUIS allows interaction device configuration and calibration during gameplay. It also allows the Oculus Rift, Kinect 2, and Razer Hydra or PS Move to be used simultaneously without adjusting any prior configuration files. To make an object intractable, add a collider and RUISselectable script to the object.

Table 3: Device, Interaction, and display comparison.

	Features	getReal3D	MiddleVR Academic Edition	RUIS
Common VR Game Devices	Kinect (v1,v2)	X	✓	✓
	Oculus (1,2)	X	✓	✓
	Leap Motion	X	✓	X
	Razer Hydra	X	✓	✓
	PS Move	X	X	✓
	WiiMote	✓	X	✓
Interaction	Navigation	✓	✓	✓
	Manipulation	✓	✓	✓
	Immersive Menus, GUI, Webview	X	✓	X
Displays	Viewports	Unlimited	Unlimited	3
	Stereo	Side-by-Side	Side-by-Side / Oculus	Side-by-Side, Top-and-bottom/ Oculus

The getReal3D toolkit is built on top of trackd, which supports a number of 3D trackers and controllers. Regarding common consumer VR devices like the ones shown in *Table 3,* getReal3D does not offer many 3D trackers and controllers support compared to MiddleVR and RUIS. For interaction, all toolkits offer some navigation and manipulation using a wand. MiddleVR is more extensive in giving different options on how to manipulate objects and offering an Immersive Menu. RUIS does offer a 2D menu system through the NGUI

interface that is primarily for device selection and calibration. MiddleVR and GetReal3D offer clustered active stereo with OpenGL Quad-Buffer. For this, high end graphics cards are needed. In MiddleVR this is easily setup using the MiddleVR configuration tool and adding stereo cameras for each display. GetReal3D offers a getRealDisplayScreens script but no documentation on how to get active stereo working. With RUIS display manager, the application can run in any number of stereo displays when running in windowed mode, however, D3D11 Force Exclusive Mode must be disabled because that forces the application in full screen mode. With RUIS 3D displays side-by-side and top-and-bottom modes are supported.

MiddleVR offers several predefined-configurations for Oculus, NVIS, Sony and Vuzix HMDs. MiddleVR also has predefined configurations for passive stereo and 3D TVs. No user configuration interface for displays is given with the getReal3D toolkit. To get the proper display configuration the specifications for the user's system must be sent to Mechdyne and they will test and send the desired configuration file.

Taking into account multiple devices in the same system leaves a lot of room for comparison. RUIS supports the Oculus Rift, Kinect 2, and Razer-Hydra in the same coordinate system. MiddleVR only has set configurations for two devices such as the Oculus and Razer Hydra or Oculus and LeapMotion. MiddleVR does support the Kinect 2 but has no predefined configuration for using it with any other devices, such as the Oculus and Razer-Hydra. The trackd software that is used by getReal3D offers configuration files for each of the supported devices shown in *Table 1,* however there are no configuration files for using multiple devices in the same coordinate system.

RUIS multi-display setups have future plans on enabling Oculus Rift with the multi-displays when Oculus SDKs that support this are available. This will allow multiple users to view the scene while one user wears the Oculus Rift. Currently the Oculus Rift can be used for head tracking only while using multi-display setups. However RUIS did recently have added support for Unity 5 and it is unclear if they have enabled support for this.

Table 4 shows a comparison of the toolkits regarding supported OS and Unity versions, licenses and associated costs, as well as support offered.

Table 4: Software and license comparison

Features	getReal3D	MiddleVR Academic Edition	RUIS
Toolkit version	3.0.1	1.6.0.f4(Unity 4.2-4.6),1.6.1b3(Unity 5)	1.06 (Unity 4.6), 1.07 (Unity 5)
Platform	WinXP 32/64, Win 7 32,64	Win XP, Vista, 7, 8, 32/64	Win XP/Vista/7/8/ OSX
Unity version	4.3 - 4.5	4.2 and above, 5-beta	4.6, 5
Unity license	Pro	Pro for Oculus, active stereo, cluster	Pro for Oculus in 4.6, Indie for 5
Other software	DirectX11, trackd	DirectX11, MS Visual Studio 2012	OpenNI for Kinect v1, Moveme for PS Move
License type	demo / paid	Free/30 day trial/ paid	LGPL Version 3
Cost	>$3000	>$3000	Free
Support	Professional	Professional, Forum	Forum

RUIS is the most versatile when it comes to operating systems with support for WIN 8 and OSX. With no Windows 8 support and only Unity support up to version 4.5, getReal3D is the least up-to-date toolkit with respect to platform versions. A demo license is offered with getReal3D which is used for testing for this report. Currently for any change in the system a new configuration file must be sent by the getReal3D support.

For an educator one of the biggest challenges in creating a VR system is cost [21]. It is unclear what the cost of getReal3D will be but it seems to be competitive with other academic licenses. MiddleVR offers a free version and a 30 day trial of HMD, Academic, or Professional versions. RUIS is distributed under the LGPL Version 3 license. The most attractive part about RUIS when compared to the other toolkits is that it is free.

Regarding support most requests made to MiddleVR are answered within a few hours. Sometimes they are answered the next day but this is probably due to the time difference as the headquarters is in Paris, France. Professional support is available for getReal3D with most email responses within a day or two. RUIS has an active forum where questions can be submitted and are commonly answered the same day.

8.   Rubric Comparison

In order to qualitatively compare the toolkits, a rubric system was created based on a software evaluation rubric presented in The 21st-Century Classroom: Teaching and Learning with Technology [22]. *Table 5* shows a rubric system concerning the documentation and support provided for each toolkit. This involves analyzing the documentation provided, technical support, help options, tutorials and examples given. These attributes can help gauge the initial learning curve required to use the software and support available to achieve proficiency. This analysis was made using demo and trial versions of the software, and is a record of this studies initial experience.

Table 5: Toolkit documentation and support evaluation rubric system.

	Evaluation Criteria					getReal3D	MiddleVR	RUIS
	1	*2*	*3*	*4*	*5*			
Software Feature	*Below*	*Above*						
	Poor	*Average*	*Average*	*Average*	*Excellent*			
Document-ation	Document-ation is excessively technical and/or difficult to follow	Document-ation is generally understand-able but not very user-friendly	Document-ation is user-friendly and reasonably easy to follow	Clear document-ation that is logical and easy to follow	Very clear, user-friendly document-ation that leaves no questions	3	4	3
Technical support	No support available	Online forum support only or emails with long response time	Online forum and emails answered in a reasonable amount of time	Online forum and emails quickly answered	Online forum, email and 24-7 real time chat or phone support.	2	4	2

Help features	Few or no help features available	Help limited to a Help or Read-Me file	User guide, forum	User guide, forum, trouble-shooting guide	Extensive user guide, reference material, trouble-shooting guide, support site, forum	2	5	3
Tutorials	No tutorials provided	One tutorial provided with no documentation	Limited tutorial and/or documents provided	Several tutorials provided	Extensive tutorials provided	1	4	1
Examples	No example provided	One example provided with no document-ation	Limited example and/or documents provided	Several examples covering some applica-tions	Extensive examples provided covering many applica-tions	2	3	5
					Total	10	20	14

RUIS provides a 22 page readme file with requirements, known issues, and installation procedures, and has a website with posts for updates in the toolkit and a forum for troubleshooting. getReal3D comes with an 11 page user guide and a 26 page developer guide outlining the basics from installation to scripting. The developer guide includes a section on enabling VR capabilities such as interaction and navigation. The guide also provides information on scripts and prefabs given with the tool. MiddleVR includes an extensive 246 page user guide with tutorials, concepts, configurations, scripting examples and much more. The guide is written for every level of Unity and programming proficiency from beginner to expert. There are sections on advanced programming, haptics, stereoscopy, VRPN server, and a troubleshooting section.

Technical support is available through an online forum for RUIS and MiddleVR but not getReal3D. No other support is available for RUIS, but getReal3D offers professional technical services 24 hrs a day via Pivot with a Mechdyne service contract. MiddleVR offers paid professional support services as well as forum and email for technical assistance.   There is also a knowledge base with a troubleshooting guide along with tips and tricks. MiddleVR offers video tutorials on a wide range of topics and documented tutorials with step-by-step logic to get the user quickly started on a working VR application. RUIS is the only toolkit that provided several example scenes inside of Unity to quickly test several VR devices in the RUIS testbed scenes. MiddleVR did provide an example Shadow executable but no project folder that can be edited inside of Unity. MiddleVR significantly outperformed the other toolkits regarding the documentation and support. Along with having extensive help documentation and video tutorials, emails were answered promptly.

A further analysis of the toolkit comparison is shown in *Table 6* using another rubric system that was created to analyze the toolkits use in VR applications involving CAVE display and interaction. Performance, flexibility and ease of use are figures of merit used for comparison, which have been stated as three primary requirements for a VR development system [5].

Table 6: Toolkit VR application figures of merit rubric system.

Software Feature	Evaluation Criteria					getReal3D	MiddleVR	RUIS
	1 Poor	*2* Below Average	*3* Average	*4* Above Average	*5* Excellent			
Perform-ance & Reliability	Not able to run application or always crashes	Slow, crashes frequently; other technical issues	Performs ok, crashes sporadically, some technical issues	Loads and performs quite fast; minor technical issues	Loads and performs quickly; reliable	2	5	4
CAVE display Flexibility	Very restricting requirements and limited hardware	Limited configure-ations and few supported VR devices	Set number of configure-ations and some support VR devices	Several configure-ation options and many supported VR devices	Quickly adapts to several supported devices and configure-ations	2	4	3
Inter-action Flexibility	Very restricting require-ments and limited VR devices	Limited configure-ations and few supported VR devices	Set number of configure-ations and some support VR devices	Several configure-ation options and many supported VR devices	Quickly adapts to several supported devices and configure-ations	2	4	5
Ease of use	Steep learning curve and support needed.	Extensive time needed to gain proficiency	Some time needed to gain proficiency	Software is easy to follow with minimal learning curve	Software is intuitive with no learning curve required	4	3	3
VR Applica-tions	Lacks some of the commonly included basic features	Only basic features are included	Basic features and additional features are included	Includes most of the features desired	Comprehen-sive features included	2	5	4
					Total	12	21	19

The CAVE display performance varied with the toolkits as the way the display appeared on projectors differed. MiddleVR can either be executed in the configurator or the Unity built executable and will appear clustered on each projected display. The display was consistent and had no performance issues. There were issues with Unity crashing and objects not displaying correctly when using the getReal3D toolkit. With getReal3D, the display system is configured specifically for the user's current VR system taking into account the resolution, display configuration, and computer hardware. It is unclear what all the changes are made to the configuration file but it took three weeks to get the file and it was not consistently working and very

unstable. When executing an RUIS built scene for CAVE display, the output is one stretched window that must be dragged to the desired location. The performance of interaction with MiddleVR far exceeded RUIS using the test bed scene with the Razer Hydra. It was much smoother and precise and allowed object manipulation while picking up, such as rotation and position return. It should be noted that the new version of RUIS with Unity 5 support, released April 23, 2015, offers more precise interaction than previous versions.

For CAVE flexibility, MiddleVR was the preferred system, with the display configurator giving the user unlimited options for screens, cameras, and tracking nodes. The cluster window allows server client configurations for connecting several computers. With getReal3D, several systems can be configured such as a 6-sided CAVE or CAVE 2. RUIS does not offer a bottom and top CAVE display.

The main focus of the getReal3D toolkit is not interaction and gaming, rather it is to display clustered active stereo in multiple different CAVE configurations. There are few wand configuration options and only the gamepad device is supported on the demo version. Therefore, getReal3D is given the lowest score for interaction flexibility compared to the other toolkits. However, it may have advantages in other scenarios.

For flexibility, RUIS offers several common interaction devices and the corresponding scripts for using them. RUIS also provides scenes with intractable devices such as hinges and levers with associated scripts. Several devices can easily be added together with tracking and CAVE display, thus giving a versatile interaction experience. MiddleVR offers a long list of interaction devices that can easily be added together with corresponding tracking nodes for head and hand. However MiddleVR does not offer much interaction or gesture recognition for the Kinect 2.

The getReal3D system had the smallest learning curve for importing into the Unity scene and executed in the RUIS configurator. The MiddleVR configurator is more complex but allows many more options than getReal3D. For some applications, RUIS is the easiest for quick CAVE display. However, RUIS distributes a project folder whereas getReal3D and MiddleVR distribute a Unity package that can be easily imported into the scene. To get the scene running with the RUIS system, the user can either create a package and import into RUIS or create a package in RUIS and import into the scene and add the needed layers and script execution order. Either way, it will take longer to implement. If the scene desired can easily be exported into a package and imported into the RUIS project folder, then this will not be an issue. CAVE active stereo was achieved using MiddleVR toolkit and documentation provided. Although this is a feature of the getReal3D and RUIS toolkits, due to lack of relevant help documentation, active stereo was not achieved for this study.

Regarding ease of use, MiddleVR is exceptional as one Unity-built executable can be adaptable to various combinations of interaction devices using the configurator. For RUIS, the interaction wands are given as prefabs with abilities of enabling and calibrating with an on screen menu while running the executable. This allows the user to test and calibrate how different devices work together without having rebuilt the scene or even open a different executable. However, each prefab must be brought into the scene and positioned correctly.

Along with navigations and manipulations, MiddleVr is the only toolkit providing immersive menus, immersive webview, and immersive custom GUIs using HTML5. This gives MiddleVR the clear advantage amongst the other toolkits concerning VR applications. RUIS offers several examples using multiple interaction devices together simultaneously. With the given prefabs the Oculus Rift, PS Move and Kinect v2 can be used together which opens up the door to many VR applications.

Overall MiddleVR only slightly outperformed RUIS in the toolkit applications figures of merit. getReal3D lagged behind the other toolkits with few configurable options and limited interaction abilities, but game and consumer devices are not the main purpose.

9. Conclusion

In this paper, a qualitative study has been conducted analyzing several toolkits available to bring VR applications to a Unity scene. By focusing on application development for a three-sided cave using wand interaction, three toolkits available were found to meet these criteria. The three toolkits analyzed all have some features and interaction options that are superior for a specific application. MiddleVR significantly outperformed the other toolkits regarding the documentation and support available. Although RUIS does offer some attractive features, MiddleVR was the most versatile toolkit analyzed regarding CAVE display and interaction. With the added bonus of immersive menus, webview, and custom GUIs, MiddleVR strongly outperforms the other toolkits in this study. getReal3D may be better suited than MiddleVR for some specific CAVE applications and training scenarios, such as CAVE 2, but due to lack of consumer device and interaction modules it scored lowest in this study. MiddleVR only slightly outperformed RUIS and with RUIS being free and highly versatile, it is promising for low budget applications.

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The Investigation of research-teaching model for undergraduate students

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Abstract

Nowadays, the research-teaching models of high education are highly developed in Chinese universities. However, many common problems are presented in these teaching processes, which are mainly three types of problems as bellows: 1. teaching evaluation mechanism; 2. creative teaching training for teachers; 3. teaching management model. The reasons of these problems are analyzed in this paper. According to several research-teaching methods，three types of research-teaching models are applied in the course Measurement Technology, which are the combination of theory and practice, the design of opening experiments, and undergraduate students integration into researching topics. These research-teaching models are proved practically to be effective methods for improving creative and practical ability of undergraduate students.

Key words：Research-teaching model; Creative teaching; Teaching model; High education

1. Introduction

Near the year of 2000, the research-teaching model is presented in Chinese high education. At the year of 2005, Chinese Ministry of Education published an Announcement about: "Several suggestions about improving the teaching work of undergraduate students". In this bulletin, the research-teaching is presented in high education and the creative ability should been trained. Furthermore, a government document, named "Several suggestions about comprehensive improvement of high education quality", gives the definition of research-teaching as follows: the creative teaching method should been implemented. Additional, the heuristic, inquiry, discussing, and participatory teaching should been advocated.

In the recent years, many Chinese universities, especially these universities in Project 985 and Project 211 are reforming teaching model and promoting research-teaching method. However, what's about the effects? Are these research models fit for undergraduate students? How many research contents are integrated into class teaching and weather the students like these research contents? A large number of questions should be considered by the teachers advocating the research-teaching model.

2. Problems of research-teaching

The combination of teaching and research method is not been promoted widely, and the research-teaching model is difficult to be realized. Three factors of such situation are discussed in this paper as follows: teaching evaluation mechanism, novel teaching training for teachers, and teaching management model.

2.1 Teaching evaluation mechanism

Nowadays, most of the teaching evaluation mechanism aims to the traditional teaching method, but not to the research-teaching model. Thus, the unreasonable teaching evaluation mechanism delays the popularization of research-teaching model. The evaluation objects mainly focus on the teaching plan, curriculum testing method, class preparation, students' evaluation, and supervisor classroom observation in the teaching evaluation mechanism now. Even most of the universities require of evaluating students' knowledge, ability, and professional skills. Actually, the evaluation focuses on the knowledge and credit, but not on the ability. This will result in the phenomenon of high scores with low abilities. It is no use for students' creative ability and resolving actual question ability. It is the primary difference between Chinese university and famous American university.

The teachers in the university works hard to pass the professional title evaluation and to sign the next job contract. Thus, keeping the teaching process in normal status is sufficient, but not caring weather use creative teaching model or integrating research into the teaching process. Most of the universities still not require the teachers about the ratio of creative teaching, which will reduce the initiative of research-teaching reformation. Some teachers are not willing to improve teaching contents, perfect teaching methods, and enhance classroom teaching quality. It will influence the development of research-teaching model.

2.2 Creative teaching training for teachers

Most of the teachers are not trained very well in creative teaching method. They just were trained in teacher induction year, and the training contents were limited in several courses as Education, Teaching psychology, and Education law. As to the creative teaching or research-teaching model, it is almost equal to zero for most of these teachers.

Nowadays, some Chinese teachers are supported by China Scholarship Council and visit in some famous American universities or in some European universities. They learned some new teaching model and methods which are very useful to improve students' ability. For example, the traditional exercises are not assigned to the students, but substituted by comprehensive practices for resolving actual problems. The comprehensive practices need use many courses and relative knowledge, and the resolving process includes model setup, calculation, programming, experiment, and deduction. However, many teachers don't wish to use creative teaching method in their teaching process because most of the students are not good at resolving these problems and the final examination looks like the best method for checking students' study.

For the university managers and educational administrators, they maybe not support such creative model because it will change the traditional working style and product new workload. Thus, those teachers visiting abroad universities have many creative methods but are not able to execute into their teaching processes.

2.3 Teaching management model

The teaching management model of universities is not desirable for the research-teaching requirements. Many universities still have not systemic, specified management method of research-teaching; still have not management institution of supporting teachers to develop research-teaching; and still have not protective regulation of encouraging students to engage in research. For example, many universities don't require how much proportion of the courses should be the research-teaching type; don't obviously require the teachers should advance the research-teaching for their workloads and professional titles; and don't require the students to choose some ratio research-teaching courses.

Above cases will result in the teachers to be lack of research-teaching positivity. Furthermore, students also have not enough interesting in the research-teaching courses. Actually, all these things should be formed the regulation or the rules. Universities should set up a managing mechanism include: target management

system, work running mechanism, service protecting method, achievement estimating rule, and guidance stimulating mechanism.

3. Method exploration of research-teaching

According to above problems, we will discuss the research-teaching method which has been applied in the course Measurement Technology in this paper.

3.1 Combination of theory and practice

In the teaching process of course Measurement Technology, the practical contents and creative thinking model are introduced into the teaching process. Measurement Technology is a professional basic course which includes measurement system composition, working principle, sensors application and so on. The knowledge is highly associated with engineering. In the teaching process, we design several experiments as signal synthesis and decomposition, sensor static characteristics and dynamic characteristics, strain gauge sensor, capacitance sensor, and inductance sensor. Students can well understand the working process of measurement system, signal and sensors after finishing these experiments.

In the teaching process, we utilize the software Matlab to simulate the signal processing and use the 3D software Solidworks to plot the sensor structures. These teaching materials integrated with PPT help students to learn the course well. For example, when discussing the capacitance sensor, the gap-change type and the area-change type are made into animation to show its work principle.

In addition, when teaching the measurement system, we require students to observe the daily life example of measurement system and to explain the example according to the structure of measurement system. When teaching sensors, students are required to find sensor materials in websites and design a novel sensor that is not presented in the textbook. Furthermore, the working principle, technical parameters, and application of the designed sensors should be introduced on the platform. The teaching and the practice are integrated very well which will stimulate initiative and creative thinking of the students. Comparing with the traditional teaching model, the research-teaching model will highly improve the study interesting.

3.2 The design of opening experiments

The opening experiments, distinguishing with traditional experiments, have no designed steps, process, and results which just provide students test components, wires, resistance and capacitance, amplifier, bread board, electric power, sensors, data acquiring card, industrial computer and so on. Students are required to test someone parameter such as temperature, pressure, or distance.

This type experiment is a challenge to students because students should find the specification materials about the sensors, set up the test circuit, learn the principle of data acquisition, and study the signal transmitting method. Then, they should construct the manipulating circuit of sensor by using bread board, wires, and components.

Generally, students will spend one week to finish such an opening experiment. They will show big interesting and achievement after they finish it. In all, doing the opening experiments is good research-teaching method which will improve their practical ability and creative thinking.

3.3 Undergraduate student integrating into research topics

In the teaching process of the course Measurement Technology, we provide several topics which are connect with the research topics in our research group. These topics are as follows: 1. the point control using

3D motion platform; 2. signal acquisition and manipulation of a gyroscope; 3. signal acquisition and manipulation of a temperature sensor; 4. signal acquisition and manipulation of a PSD sensor. These topics will assist the undergraduate students to use the knowledge of Measurement Technology into practical research process.

These topics require the students to learn the working principle and to know the specification such as the test range, resolution, test environment, output signal type, and interface type. Furthermore, the students should know the parameters, interface, install type, and driving mode of the acquisition card. They should connect the sensor and the acquisition card and program the code in order to obtain the correct sensor data.

The research period is two months. During the period, the students always take part in the research works with high interesting. They find research materials, study data acquisition card and motion control card, program application code, measure and manipulate the sensor data. Our research groups discuss the topic process with the undergraduate students and arrange the work contents in the coming week. They utilize the knowledge of the course Measurement Technology into the practical research works very well. In the end, we extract two segments of the report that the students submitted as follows: 1. "This research experiment gives us many enlightenment and stimulates our interesting. We hope learn more other type sensors, research the sensor principle, and develop some novel type sensor during our graduated study time." 2. "Thanks our teacher to give us a good chance to study sensor with graduated students. We have a great achievement in the research topic and learn the course Measurement Technology more clearly."

4. Conclusion

In all, several conclusions are shown as follows according to teaching practice in many years.

1) University should provide reasonable estimating mechanism, and encourage young teacher to develop research-teaching model. Some ratio research courses should be designed in the course arrangement. The students should choose the research courses more than 30% proportion.

2) The teachers should take part in the creative teaching training and communicate each other periodically. Those teachers who are not willing attend the creative training should be encouraged to join into it.

3) The teachers should develop different types of the research-teaching models. The students actually like the creative teaching model because it will improve their practical abilities, stimulate their study interesting, and increase teaching effects and quality.

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Awareness About E-Learning Among Arts And Science College Students

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Abstract

e-Learning is a term that is used to refer to computer-based learning. e-Learning uses web-based training and teaching materials, CD-ROMs, learning management software, discussion boards, e-mail, computer-aided assessment, simulation, online conferencing and other related methods. e-Learning may also be defined as the acquisition and use of knowledge distributed and facilitated primarily by electronic means. e-Learning can take the form of courses as well as modules and smaller learning objects. e-Learning is more focused on the learner and it is more interesting for the learner because it is information that they want to learn. The purpose of the study is to find out the level of awareness about e-Learning among Arts and Science college students. The present study consists of 250 college students studying in Arts and Science colleges situated in Namakkal District of Tamil Nadu. The sample was selected by using simple random sampling technique. The main findings of the study reveals that the Arts and Science college students are having moderate level of awareness about e-Learning and irrespective of sub samples of the Arts and Science college students are having moderate level of awareness about e-Learning. The awareness about e-Learning of male students is better than their counter part. The awareness about e-Learning of urban students is better than their counter part. The awareness about e-Learning of science students is better than their counter part. The awareness about e-Learning of the students who are using internet daily is better than their counter part.

Key word- e-Learning

e-Learning

e-Learning is a term that is used to refer to computer-based learning. e-Learning uses web-based training and teaching materials, CD-ROMs, learning management software, discussion boards, e-mail, computer-aided assessment, simulation, online conferencing and other related methods. e-Learning may also be defined as the acquisition and use of knowledge distributed and facilitated primarily by electronic means. This form of learning depends on networks and computers but may involve CD-ROMs, software, other media, and telecommunications. e-Learning can take the form of courses as well as modules and smaller learning objects. e-Learning may incorporate synchronous or asynchronous access and may be distributed geographically with varied limits of time (Wentling et al. 2000). e-Learning refers to the use of information and communication technologies to enable the access to online learning/teaching resources. In its broadest sense. Abbad et al (2009), defined e-Learning to mean any learning that is enabled electronically. They however narrowed this definition down to mean learning that is empowered by the use of digital technologies.

Advantages of e-Learning

There are many advantages to online and computer-based learning when compared to traditional face-to-face courses and lectures.

- Students may have the option to select learning materials that meets their level of knowledge and interest
- Students can study anywhere they have access to a computer and Internet connection
- Self-paced learning modules allow students to work at their own pace
- Flexibility to join discussions in the bulletin board threaded discussion areas at any hour, or visit with classmates and instructors remotely in chat rooms
- Instructors and students both report e-Learning fosters more interaction among students and instructors than in large lecture courses
- Successfully completing online or computer-based courses builds self-knowledge and self-confidence and encourages students to take responsibility for their learning
- Learners can test out of or skim over materials already mastered and concentrate efforts in mastering areas containing new information and/or skills

Review of Related Studies

Azliza Yacob et. al. (**2012**) Student Awareness Towards E-learning in Education. This paper examines the awareness of e-learning that involves student from TATI University College in Malaysia as a respondents. The students have being exposed to the e-learning studies in campus as approach to gather more information in their studies. 200 students participated in the study. Multiple regression analysis was performed on the students' perceptions in relation to gender, year of study, faculty, technology usage and the awareness of e-learning implementation.

Valentina Arkorful (2014) The role of e-Learning, the advantages and disadvantages of its adoption in Higher Education. This study investigates the effectiveness of using e-learning in teaching in tertiary institutions. In institutions of higher education, the issue of utilizing modern information and communication technologies for teaching and learning is very important. This study reviews literature and gives a scholarly background to the study by reviewing some contributions made by various researchers and institutions on the concept of e-Learning, particularly its usage in teaching and learning in higher educational institutions. It unveils some views that people and institutions have shared globally on the adoption and integration of   e-learning technologies in education through surveys and other observations. It looks at the meaning or definitions of e-Learning as given by different researchers and the role that e-learning plays in higher educational institutions in relation to teaching and learning processes, and the advantages and disadvantages of its adoption and implementation.

Need and Significance of the Study

e-Learning is more focused on the learner and it is more interesting for the learner because it is information that they want to learn. e-Learning is flexible and can be customized to meet the individual needs of the learners. e-Learning helps students develop knowledge of the Internet. This knowledge will help learners throughout their careers. e-Learning encourages students to take personal responsibility for their own learning. When learners succeed, it builds self-knowledge and self-confidence in them. Educators and corporations really benefit from   e-Learning. Learners having the opportunity to learn at their own pace, on their own time, and have it less costly. Today all the students should aware about e-Learning. So, the investigator in the present study wants to find out the level of awareness about e-Learning among Arts and Science college students.

Statement of the Problem

The problem undertaken by the investigator is stated as

"Awareness About e-Learning Among Arts and Science College Students".

Objectives of the Study

The investigator of the present study framed the following objectives:

1. To find out the level of awareness about e-Learning among Arts and Science college students in Namakkal district of Tamilnadu, India.
2. To find out whether there is significant difference between the following sub samples with respect to awareness about e-Learning.
   a) Gender [Male / Female]
   b) Locality [Rural / Urban]
   c) Subject [Science / Arts] and
   d) Using Internet [Daily/ Occasionally]

Hypotheses of the Study

The investigator of the present study framed the following hypotheses:

1. There is significant mean difference between male and female students with respect to awareness about e-learning.
2. There is significant mean difference between rural and urban area students with respect to awareness about e-learning.
3. There is significant mean difference between science and arts subject students with respect to awareness about e-learning.
4. There is significant mean difference between the students who are using internet daily and occasionally with respect to awareness about e-learning.

The Method

In the present study, the investigator applied normative survey as a method. The normative survey method studies, describes and interprets what exists at present.

Sample

A sample is a small proportion of a population selected for observation and analysis. By observing the characteristics of the sample, one can make certain inferences about the characteristics of the population from which it is drawn.

The present study consists of 250 college students studying in Arts and Science colleges situated in Namakkal District of Tamil Nadu, India. The sample was selected by using simple random sampling technique. The sample forms a representative sample of the entire population.

Tool Used

The investigator of the present study selected and used the awareness about e-learning scale was constructed and standardized by 'Dr.M.Suresh Kumar' for data collection.

Statistical Techniques Used

For the analysis of the data, the following statistical techniques have been used.

a.   Descriptive analysis (Mean & S.D) and
b.   Differential analysis ('t' test)

Testing of Hypotheses

Table - 1

Showing The Mean and Standard Deviation of Awareness about e-Learning Scores of Arts and Science College Students

Variable	Sample	N	Mean	S.D	t-value	Significant at 0.05 level
Gender	Male	165	16.85	1.91	3.5	Significant
	Female	85	15.80	2.58		
Locality	Rural	192	15.74	2.71	3.16	Significant
	Urban	58	16.50	1.37		
Subject	Science	168	16.11	2.48	0.97	Not Significant
	Arts	82	15.77	2.84		
Using Internet	Daily	228	15.93	2.54	1.77	Not Significant
	Occasionally	22	14.90	2.67		

Summary of Findings

The following are the main findings of the present investigation.

1. The Arts and Science college students are having moderate level of awareness about   e-Learning and irrespective of sub samples of the Arts and Science college students are having moderate level of awareness about e-Learning.
2. Male and female students differ significantly in their awareness about e-Learning scores.
3. Rural and urban area students differ significantly in their awareness about e-Learning scores.
4. Science and Arts students do not differ significantly in their awareness about e-Learning scores.
5. The students who are using internet daily and occasionally do not differ significantly in their awareness about e-learning

Conclusion

The present study reveals that the Arts and Science college students are having moderate level of awareness about e-Learning and irrespective of sub samples of the Arts and Science college students are having moderate level of awareness about e-Learning. The awareness about e-Learning of male students is better than their counter part. The awareness about e-Learning of urban students is better than their counter part. The awareness about e-Learning of science students is better than their counter part. The awareness about e-Learning of the students who are using internet daily is better than their counter part.

Educational Implications

The result of the study shows that the level of Arts and Science students awareness about e-learning , so the implementation of e-Learning will be the best way for students to be aware of new technology and willing to study in various concepts. e-Learning can accommodate different learning styles and facilitate learning through a variety of activities. e-Learning develops knowledge of the Internet and computers skills that will help learners throughout their lives and careers.

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The Humanistic Education in a Unique Pre-Service Teacher Education Program for Ethiopian Immigrants: A Foundation for Bridging Gaps

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Abstract

The unique pre-service teacher education programme for Ethiopian immigrants, operated at a Teacher Education College, encompasses two main approaches to value-oriented education, the pluralistic and particularistic approaches. The programme constitutes a challenging ladder which can reduce the educational, social, cultural, instructional and professional gap of Ethiopians in Israel. This paper presents the humanistic theory perception and displays its characteristics in the unique programme. In order to demonstrate the humanistic education principles in the unique programme, the interviews and documents which accompanied the programme were content analysed. Findings of the case study highlight the applicable and practical components of the humanistic education principle, thus enabling operation of the programme and the success thereof. The insights obtained from the study can facilitate development of unique pre-service teacher education programmes for minority groups that experience difficulties and a gap vis-a-vis mainstream groups.

Keywords: humanistic education, empowerment, Ethiopian immigrants, pre-service teacher education programme, case study

Introduction

The unique pre-service teacher education programme for Ethiopian immigrants was consolidated on the basis of the humanistic education principle, multiculturalism principles [1] [2] and the Freirean theory [3]. This paper relates to the implementation of the humanistic pedagogy principles which constitute an extensive conceptual framework. This framework facilitates reference to people's personality as a whole, knowledge and culture expansion, personal actualisation and equal opportunities for higher education.

The paper comprises five chapters. Chapter 1 describes the programme, Chapter 2 presents the humanistic education principles, Chapter 3 deals with the methodology, Chapter 4 discusses the findings and the manifestation of the humanistic theory in the programme and Chapter 5 summarised the paper.

1. The unique pre-service teacher education programme for Ethiopian immigrants

The pre-service teacher education programme organised by the college for Ethiopian immigrants was conceived on the basis of needs which emerged from the field. The programme aimed to educate Ethiopian pre-service teachers [hereafter – "Students"] in order to enable them to be integrated in the education system. These students have unique needs. Hence, this calls for a unique education programme designed to nurture, empower and grow

pre-service teachers among the Ethiopian community while being sensitive to the various collective and individual needs [4].

The programme mainly aimed to offer members of the Ethiopian community an opportunity to be integrated into the Israeli society by acquiring a familiar profession, responding to the unique needs of Ethiopian immigrant students who encounter difficulties in their absorption in Israel. The picture of the situation in 2000 indicated that **none** of the Ethiopian students complied with the admittance prerequisites for attending the teacher education pathways at the college. Moreover, it showed that in the district of the college there were **no** Ethiopian teachers in all the schools where Ethiopianimmigrant pupils were learning. The numerical-statistical gap illustrated cultural gaps and deprivations which require an initiative for changing the situation.

The principles of the programme were based on learning in a flexible education pathway in two study frameworks: a separate group of Ethiopian immigrants (according to the particularistic approach) and an integrated group with all the other students (according to the pluralistic approach). Furthermore, unique admittance prerequisites were defined and an emphasis was put on the development of the personal-professional image and an individual and group support. The programme included contents and sources taken from the heritage of the Ethiopian immigrants and they were studied in the different courses. This was done in order to draw the students nearer to their heritage, expose new aspects of their life being, establish identification with their heritage, be proud of it in the hope that they would also inculcate it to learners in the education system. The process of empowering the pre-service teachers was implemented throughout the education period at all stages.

The faculty members who taught in the education programme were meticulously chosen. They were aware of the multicultural perception in education and of the differentiation between the students at the college. The programme lecturers underscored the need to change and adapt the teaching methods to the Ethiopian students. The programme included unique courses and exclusive initiatives such as a trip to Ethiopia at the end of the studies. As part of the multicultural discourse of the entire college, a learning centre entitled 'The Legacy of Ethiopian Jewry' was set up for the purpose of organising workshops, educational activities and activities focused on the exposure of the community heritage [5].

After ten years of operations, the programme had about 150 graduates, 65% of whom were well integrated into the formal education system and in the informal education system. Some 5% of them continued their studies towards an M.Ed. degree [6] [7].

2. The humanistic education

This chapter is a literature review of the humanistic education principles: people's personality as a whole, enhancement of knowledge and culture, personal actualisation and equal opportunities for higher education. The conceptual framework of the **humanistic education** constitutes an important and solid foundation for the promotion and nurturing of the Ethiopian immigrant group that failed to be integrated into pre-service teacher education studies. The unique programme planned for the Ethiopian immigrants with the purpose of enabling them to bridge the gap between them and students from the Israeli society learning at the college, serves as a means and a model for developing similar programmes. Further on, the paper presents the essential fundamentals of the humanistic education and indicates some characteristics as they are manifested in the unique programme.

The humanistic education characteristics are grounded in a 2500-year humanistic legacy since Aristotle presented the ideal of humanity. These characteristics encompass qualitative features for a worthy humanity at its best: honesty, harmony, critical reflection, enhanced education, strong character, social involvement, personal and democratic sensitivity, empathic sensitivity, self-actualisation and meaningful existence.

These features find their expression in the extensive pedagogical literature. According to Aloni [8] [9], there are three integrated components: 1. Education for an active, democratic and responsible citizenship; 2. Cultural

nurturing of the pupil/student' personality through systematic exposure to the best human thought and creation; 3. Actualisation of the skills and tendencies embodied in the pupil/student' personality.

Darom [10] extensively describes the humanistic education and scholars' educational theories of thinking underpinning the humanistic education: Maslow, Rogers and Combs.

Maslow [11], one of the prominent pioneers of humanistic psychology at the end of the 2nd World War, argued against behaviourism and psychoanalysis. He wanted to learn about the nature of people not from pathology but rather from human success. Maslow minted the term 'self-actualisation'. That is, 'according to Maslow people who attained self-actualisation fully exhaust their talents, their ability, their potential. These people seem to actualise themselves and make the best of themselves" [10, p. 254]. Maslow underscores that he does not describe an absolute human situation. Rather, people are constantly undergoing a process of self-consolidation and the properties constitute a possible development orientation towards people who are 'human in the full sense of the word' [10,p. 254].

The Hierarchy of Needs conceived by Maslow [11] integrates the self-actualisation concept into a comprehensive model of human motivation. The model is founded on the analysis of people's basic needs, motivating them towards activities which can meet these needs. The model ranks the needs in a hierarchical way, the basic ones being on the physiological, safety, love and belonging level. At the head of the pyramid are the need for esteem and the need for self-actualisation. The human aspiration to grow and develop, exhaust their full potential,is perceived by Maslow as one of people's basic needs. This need is manifested, provided people have satisfied all the previous needs in the hierarchy. People can be attain this on condition that the individual and the society managed to create an environment without hunger and lack of safety, inter-personal alienation and disrespect of people's value. The hierarchy of needs model elaborated by Maslow in order to understand people is particularly relevant to issues of education. The revolutionary humanistic approach applied here is learners' internal motivation rather than coercion as well asreward and punishment policy. This is a perception and way of thinking about people and of the society that discusses moral, values and orientations of general human progress.

Rogers [12] introduced into the humanistic education the lessons learnt from his professional-therapeutic experience. He argued that the success of the therapeutic process resides in the nature of the inter-personal relations established between the therapist and the client. The essential means is the reflection . 'I am with you… I understand you… I do not judge you… On the contrary, I accept you… I cherish you as a person of value… whichever your feelings, fears, sensations are…" [10, p. 258].

The learner-centred focus is the approach which Rogers integrated into the field of education. Education must focus on learners. The essential process transpires in the learners. They will learn through independent activity, in an atmosphere which does not entail pressure, in a supportive and empathic climate. Teachers are the facilitators experience emotions and thoughts of appreciation, caring, trust and respect for the learners. One can distinguish five qualities leading to an experiential learning which is characterised by these qualities. The first quality is learners' personal involvement, both intellectual and emotional. The second is a learning which is initiated by the learners themselves. Even if the stimulus is an external one – by the environment and by a facilitator/teacher, the act of revelation and the flicker of the new comprehension focus on the learners. The third quality is a learning which permeates internally and leaves a mark on the learners' behaviour, attitudes and sometimes their personality. The fourth quality is associated with the learners' self-esteem. They know whether the learning has advanced them, developed them and satisfied their needs. The fifth quality is related to meaning. An experiential learning with the above mentioned qualities is the deepest approach to learning for the learners, leading to their personal growth. Rogers [12] sums up the characteristics of people who fully function: people open to experiences in their life. They are capable of living the moment, relating to their organism as to a trustworthy entity. People who are open to the entirety of the social impact factors, their own needs and perceptions. Their behaviour grows as a result of their awareness of the growth processes which they are undergoing.

The humanistic education principles [12], can draw educators nearer to exhaustion of the qualities required for people's full functioning, putting an emphasis on the nature of the inter-personal relations which constitute the infrastructure.

In addition to [11] and [12], Combs [13] is another theorist who is identified with the humanistic education fundamentals. He underscored the nature of learners' self-image as a major factor determining their learning. Combs specifies seven principles of the humanistic education: develops the learners' experiences that are associated with their unique capability; enhances learners' self-actualisation; develops acquisition of basic competences people need in a multicultural society (academic, personal, inter-personal, communicational and economic competences); involves learners personally in democratic processes of making educational decisions and implementing them; acknowledges the importance of emotions, individual perceptions and values in educational processes; develops learning environments which offer a challenge, comprehend, support and are free of threats; develops the learners' true concern for others and appreciation of values of the unique as well as for the skills of settling situations of conflict.

In fact, Combs (1983) integrated the ideas of Maslow [11] about self-actualisation and the theory of Rogers [12] regarding inter-personal relations. Thus, he described the humanistic education as a cognitive, effective, value-oriented and behavioural education.

Containing the entire humanity of the learner. According to Combs, education should teach young people to understand themselves, others and the human society in which they live. He connected education and the social change.

Moreover, Combs (1983) sets a link to the concepts of Dewey (1960) (see elaboration below), pioneer of the progressive education who had a strong impact on modern education in general and humanistic education in particular.

Darom [10] stipulates that it is difficult to find uniformity in the definitions and characteristics. Each of the scholars representing a theory has another hue and other emphases which form models and perceptions within the extensive field of humanistic education. He argues that there are four major qualities which are the common fundamentals of humanistic education: holistic, humanistic, relevant and experiential. The four qualities on which the humanistic education is based originate in the theory of Dewey [14]. Education according to Dewey is a process whose essence is the very practice and learning it involves rather than the outcome. Education is synonymous with growth, namely the objective of growth is another growth.

Darom [10] attempts to decode the humanistic education characteristics and the way to implement them from theory to practice. He presents 16 principles obtained from content analysis of tens of papers (about 100) and chapters from books (approximately 90). These principles which are common to most scholars yield a clearer picture of the extensive field of humanistic education. Below are the main points: effective (emotional) emphasis, personal growth, inter-personal proximity, integration (of emotion and intellect, of the individual and society, of the learning process and life), relevancy, autonomy (of learners), context (teachers and learners are not cut off from the environment which is a source of a multitude of effects on education – politics, social climate, norms, values, economic situation), change and innovativeness, diversity and creativity, orientation to the process (focusing on the process which combines two objectives: assists in building an infrastructure, atmosphere, climate which facilitate a deep approach to learning as well as raise the processes up to a learning content level which is consciously processed in class), individualism, democratic collaboration, reality (emphasising that people are real here and now with their emotions, awareness of themselves and of involving others in them), 'past-personal' factors (part of the whole personality), appreciation and focus on people.

These factors which are extensively specified [10], form the fundamental assumptions of the humanistic education and will serve as touchstones for analysing the programme designed for Ethiopian immigrants.

3. Methodology

The study was conducted according to the qualitative-interpretive approach of a case study. The case study enables an in-depth observation on occurrences in a small group [15]. The research population consisted of eight lecturers who taught in the programme and four college officials who were partners to the building and leading of the programme. The study included interviews of the 12 lecturers and programme leaders as well as an analysis of 11 documents such as: position papers, minutes of the steering committee meetings, programme assessment reports and annual summaries by the programme coordinator. The interviews and documents were content analysed. Definition of the categories was done on the basis of previous studies which explored pedagogical perceptions (ETIC) and of the collected data (EMIC) [16]. The categories were accepted after reaching a concurrence of at least 67% between the researchers. The analysis was performed on the following levels: the individual interview level and the group interview level, the single document and the entirety of the documents [15].

4. Findings

4.1 The humanistic education principles as they are manifested in the pre-service teacher education programme for Ethiopian immigrants

Aloni [8] indicates that pre-service teacher education programmes are grounded in findings of studies according to which teaching-learning processes develop if they are designed with reference to the humanistic discourse. Hence, the teaching method should be changed from both the theoretical and applied aspects. The pre-service teacher education programme for Ethiopian immigrantswas built according to the humanistic education fundamentals. Analysis of its development revealed humanistic components which led to the consolidation of the theoretical parts as well as the practice in the unique programme. Below are the major components manifested in the programme.

The world of contents

The programme comprises contents and sources from the Ethiopian immigrants' legacy which are studied in the various courses. During the authentic and relevant class discourse the students became acquainted with their heritage, learnt to be proud of it and even to hope that in future they would inculcate it to learners in the education system. One of the literature course lecturers expressed herself in the following way: 'It is very important to allocate room for the legacy. I use texts from their culture in my lessons…'. Another lecturer said: 'If I choose to teach poetry, these are poems written by Ethiopian immigrants. I help them to write poems and stories from their world, mainly narratives oftheir immigration to Israel'. Another example: 'In the computer applications course, the students were requested to surf the internet searching for information about the Ethiopiancommunity' (excerpts from the lecturers' interviews). A general view of the pre-service teacher education programme for Ethiopian immigrants ' illustrates the students' internal motivation to advance, both on the academic and personal levels. The students attest to their great desire to know more about their legacy and enrich their knowledge. They appreciate the value-oriented world, specifying the values of modesty, honesty, respect for grownups which are part of their culture and they wish to preserve and strengthen these values. In particular assertions of this kind were prominent in the roots-searching journey to Ethiopian and the encounter with the culture they left behind when they immigrated to Israel.

In fact, the world of contents which integrates the legacy and culture of Ethiopian Jews shows that the Ethiopian students perceive the humanistic education as a collective entity with a 'personal past' which enhances the creation of the learning process as a full partner to the content building. The distinguished place of the Ethiopian immigrants' unique contents manifests both overtly and covertly the criticism against the fact that these content areas are not studied and are being eliminated due to the wish to be rapidly absorbed in the Israeli society and

in the dominant mainstream. This way entailed building of 'stone upon a stone', namely building strata for reducing the gap between the Ethiopian immigrants and the other students.

Teaching strategies

The teaching processes in the Ethiopian immigrants' class are grounded in the understanding that students' learning styles are culture-dependent. Belief in the humanistic education and comprehension of creating a class dialogical system brought about teaching and learning strategies suitable to every individual, every student, according to their abilities and culture. One of the lecturers pointed out:'I devote manyhours to interpretation and finding of analogies'. Another example: 'Maximum attention should be paid to the language, basic competences in written and spoken expression'(excerpts from the lecturers' interviews). One of the principles in the vision of the unique programme, prominent in the documents summarising every year of activity, is the principle of seeing students in a holistic view. That is, 'Seeing students on all the levels where they are at simultaneously during the process of their pre-service teacher education. The human aspect, expansion of their general education, exposure to the culture of the world, to new competences, to their social, familial, economic and academic place' [21].

One of the humanistic education principles [8] [10] is manifested here, namely the holistic principle which puts the whole person at the centre. It engages in a wide variety of competences – from reading, writing and mathematics and up to problem solution, communication and understanding oneself and others.

The teaching staff

The staff was chosen based on a multicultural and humanistic orientation. 'He attended an in-service training course about the legacy of Ethiopian Jews and he is aware of the humanistic perception in education regarding students' differentiation and special needs. A procedure of continuous relation between the lecturers was designed, allowing personal follow-up and adjustment of the programme, so that the academic requirements are not undermined' [17].

In this context another humanistic education principle is highlighted [10]. This is the relevancy principle which is tightly connected to learners' life, aspiration to acquire knowledge, grow, love and find a meaning to their existence.

The roundtable discussion with the lecturers of the unique programme shows that in part of their lessons they embraced the theory of learning conceived by Rogers [12]. That is, manifesting the humanistic education principle according to which the learners were personally involved in the learning. Within the framework of their practicum they moved from the stage of active learning to practical experiences. They were requested to initiate special activities designed to consolidated their status as representatives of the Ethiopian community and as individuals with a professional knowledge of teaching in the schools into which they were integrated. They introduced into the training sessions at the Centre for the Legacy of Ethiopian Jewry their personal experience acquired by personal interviews of their families and relatives and by perusal of professional literature. They related to their pupils at school as to learners who trust them and want to be promoted by them. Thus, a sort of pyramid of deep approach to learning was formed on all levels, from studies at the college, learning from the tutors, learning from the mentor-teachers at school as well as support granted by colleagues and accompanying pedagogical instructors [5].

Practical experience in teaching

A special instruction and practical experience setup was designed, consisting of a group reflective discourse. The humanistic education principle [14], i.e. practical experience and full integration of practice and theory,

was manifested by the component of training through maximal attention by the programme leaders. The considerations stemmed from understanding the importance and contribution of the practical experience to the comprehensive education of the Ethiopian immigrant students. One example is a group which practiced in Kiryat Malachi, after a focused preparation for integration at school. The practical experience was performed on a special basis of a whole group that came to the school and also made a contribution to the school beyond the tasks of lesson observation and current experience. This was a way to attain personal empowerment and support already at the initial stages or as the students said: 'The practicum reinforced outself-confidence' and 'We felt what being welcome meant'. Moreover, power was encompassed in the very arrival of a whole group to school rather than of pairs or individual students.

As part of this approach and among the other activities of the students scheduled to practice in the 2nd-6th grades, the students participated together with the pupils in a national virtual quiz game entitled 'Discover its beauty' which engaged in the legacy of Ethiopian Jewry. The pupils reached the final stage of the competition and won the 4th place. The students organised visits to 'The Legacy of Ethiopian Jewry' learning centre at the College [18]. The learning centre constitutes part of the discourse at the college and it organises workshops and educational activities. The learning centre demonstrates the heritage of the Ethiopian immigrant community to the students at the college and to the pupils in the neighbouring schools. This is an actualisation of the fourth humanistic education principle [10]. The experiential principle of the humanistic education, which leads to a learning climate infused with both challenge and support as well as considers the uniqueness of all learners, their needs and objectives [10].

The successful practicum was a very beneficial experience in the learning process and the acquisition of the teaching profession. The positive reverberations of the practicum were highly satisfactory to both the programme leaders, the partners in the field of education and the students. This was a considerable challenging hurdle which they managed to overcome and which invigorated and encouraged them on their continued way.

Support setup

Within the framework of the individual support, the students learnt how to conduct themselves in the life areas of work, studies, family, personal counselling, learning disabilities diagnosis, personal and academic support and inculcation of basic learning skills. This manifested the humanistic view of seeing students as a holistic entity and the need to refer to everything associated with the needs. Shapira [in 10] indicates several principles, attempting to characterise the humanistic education: comprehensive holistic approach, emotion-intellect connection, social-democratic change, finding syntheses between essences such as relevant process and content as well as consideration of the 'personal-past' factor.

The individual mentoring was another form of accompanying the Ethiopian immigrant students. This was done by excelling students at the beginning of the way and by other students later on as peers. The mentoring was mainly manifested by individual academic assistance. The humanistic education by its very nature of being people-oriented applies here on both sides – the mentors and the mentees. The contribution was reciprocal and the mentors knew how to derive great satisfaction from the unique encounter. One of the mentors pointed out in a summing up conversation: 'I benefited and contributed, I made myself a friend' [18, p. 182].

The group mentoring engaged mainly in presenting common issues. It offered an opportunity to alleviate difficulties and a sense of distress and created a soil for consolidating new positions and approaches, being a support group. This support group illustrated from theory to practice the second principle of the humanistic education [10]. The humanistic principle assists learners to gain more esteem and respect for themselves and for others. It encourages collaboration and conflict settlement by way of negotiation and dialogue.

Moreover, the spirit of the humanistic education is illustrated by the research findings of Millet & Gilad [5]. The findings showed that the college and the lecturers played a meaningful role in the teaching and learning.

The standards focused the belief in the students' capabilities and the commitment to lead them to the required attainments.

The students mentioned the components of the programme and the characteristics thereof: flexibility, gradation, enhanced fundamental studies, group and individual support setup and mentorship. According to them, due to these factors, the programme provided a response to their needs and enabled them to acquire education, profession and an opportunity to be well integrated into the Israeli society [5, p.44]. The humanistic perception of exhausting the students' potential was strongly manifested here in all the support setup in order to implement from theory to practice the ideas presented by various theorists [11], [14], [13], [10], [9].

To sum up, a brief review of the programme structure and components indicates that the humanistic education principles were encompassed in the programme as a basis for narrowing the gap between the weak minority group and the mainstream majority.

The programme was structured according to the needs of the Ethiopian immigrant students and was based on the principles of flexibility, gradation and individual support. As mentioned above, the programme integrated the approach of the particularistic multicultural education in the first year and the approach of the pluralistic multicultural education in the following years.

In the first year the programme underscored the academic contents on the one hand and the inculcation of the linguistic foundations and teaching strategies on the other. The choice of general academic contents allowed the students to build a wide basis of education as a preparation for the disciplinary learning in the specialisation studies. This emphasises the humanistic education view of exposing students to the general culture and of enriching their world.

As a result and according to the first objective (inculcation of linguistic foundations and teaching strategies) the curriculum included basic courses designed for preparing an infrastructure for the learning. For example: fostering mathematical thinking, English, writing skills, expression and comprehension, computer fundamentals, language basics, learning strategies and preparation for the SAT test. In accordance with the second objective (general academic contents) the following courses were chosen: history of the People of Israel in its country, pedagogy, Judaism, history-the classic world. In the disciplinary studies too an emphasis was put on the inculcation of basic knowledge and basic skills for academic learning. A holistic view of students in line with the humanistic education principles as well as an elimination of deprivations and gaps can be identified here. The courses and the accompanying activities which dealt with the legacy of Ethiopian Jewry manifest the principles of education for multiculturalism by learning about the 'self' and the 'other' in order to empower the weak individuals to express themselves.

In the second year the students learnt twice a week general pedagogical subjects of the pathway and on the other days they attended the specialisation courses according to their choice. At the same time they started their practicum: during the first semester a weekly workshop took place, dealing with pre-teaching processes. It aimed to prepare the students for the practical work at school by learning and experiencing teachers' field of engagement within a supervised framework. This illustrated the characteristics of the humanistic education: relevancy, experience, integration of intellect and the emotion and actualisation of the personal competences of the individual students.

In the third year the programme enhanced the teaching experience by expanding the knowledge of different teaching strategies, acquaintance with unique issues of education and practice with learners from different groups and ages. Moreover, the students practiced and attended an academic writing course (for writing seminar papers), based on independent search in bibliographic sources, headlines organisation, writing a scientific assignment. This was grounded in the humanistic education principle of developing and actualising the individual students' skills.

In the fourth year the studies underscored three foci: continued practicum at school, an end-of-year project and writing seminar papers. Furthermore, the programme included instructional tours which offered the students a window of opportunities for getting acquainted with the country and its various aspects. This fact was

validated by the very profile of the students: most of them were not Israeli-born and thuswere not acquainted with the geographic and historical aspects of the country. As future teachers, instructional tours and out-of-class studies will constitute for them important and meaningful educational tools in their teaching processes. These too emphasise the humanistic education principles, i.e. expanding the overall education of the students and manifesting the actualisation of their capabilities. Moreover, pedagogical principles of building a circle of knowledge and culture are manifested through a dialogical process between the lecturers and the students according to their needs.

Graduates' trips to Ethiopia

One of the salient examples of the empowerment process of the programme and its contribution to the personal, professional and cultural identity is the trips to Ethiopia [19] [20]. The students described these trips in the following manner: 'The trip and the visit to the villages, the synagogues and the Jewish cemeteries proved the existence of the ancient Jewish community'; 'The trip confronted us with the long way we had passed, from being shepherds to academicians. We are capable, we can, we did it'; 'In the poverty of Ethiopia we saw learning, pedagogical thinking in the crowded classroom and mainly politeness, serenity and respect for the teacher'; '…and then we thought a lot about the essence of education' [21, pp. 34-38].

The trips to Ethiopian were the peak of the pre-service teacher education programme. The students came to the roots-searching journey with an Israeli educational, instructional and cultural charge which was entirely different from the educational and cultural views they saw in Ethiopia. This educational, social, cultural and instructional gap was prominent throughout the journey and led to thinking and assessment of the trip by the students themselves. They did it, each of them alone and all of them together as a community, from Ethiopia to Israel and in Israel until they have completed the phase of acquiring education for teaching in Israel. The journey enabled the students to consolidate their personal identity and professional perception as new teachers who managed to overcome the gap between the beginning of their personal journey from Ethiopia and the journey to Ethiopia as teacher education college graduates.

5. Summary

Observing the programme through the prism of the humanistic education enlightened unique components in the pre-service teacher education programme for Ethiopian immigrant students, components associated with bridging the gap between the latter and other students at the college.

The programme was conceived out of criticism of the education system reality. That is, until ten years ago there was not even one Ethiopian teacher in all the schools in the area around the College. The position paper submitted to the Ministry of Education with an application to open a unique programme designed for Ethiopian immigrants illustrated that educators embraced the spirit of social justice and called for bridging the gap which existed in both the college and at the schools.

Generally speaking the programme aimed in fact to offer students an equal opportunity for learning and being integrated into labour market [22]. The programme engaged in the disciplinary and pedagogical academic subjects, learning the heritage as part of a multicultural perception, skills and practicum as part of humanistic education in parallel to general topics such as: gender, equality, education for values and enhancement of schooling. It consisted of individual and group support frameworks according to the students' needs and based on the characteristics of this population as part of implementing the humanistic education principles [8], [23], [26].

The implementation of the programme for more than ten years materialises the need for a curricular reform, aspiration to equalitarian pedagogy, exhaustion of individual and group potential. Furthermore, it increases the value of social equality as an essential and crucial essence in promoting and fostering a unique social-cultural

group as well as promoting the wider society's practice and awareness of values of social justice, equality and democracy as measures which are necessary for bridging gaps.

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Teaching Big Data by Three Levels of Projects

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Abstract

"Big Data" is a new topic and it is very hot nowadays. However, it is difficult to teach Big Data effectively by regular lecture. In this paper, we present a unique way to teach students Big Data by developing three levels of projects from easy to difficult. The three levels projects are initializing project, designing project, and comprehensive projects. They are developed to involve students in Big Data, train students' skills to analyze concrete problems of Big Data, and develop students' creative abilities and their abilities to solve real setting problems.

Keywords: Big Data, initializing, designing, comprehensive, projects

1. Introduction

Numerous technological innovations are driving the dramatic increase in data and data gathering. Data are being collected at unprecedented scale in many areas, such as networking [11] [12], image processing [13] [14] [15], virtualization, scientific computation, and algorithms. The huge data nowadays are called Big Data. Big data are all-encompassing terms for any collection of data sets so large and complex that it becomes difficult to process them using traditional data processing applications [1]. They are used in a wide variety of applications, such as traffic patterns, purchasing behaviors, online video, and real-time inventory management. Big Data have become a recent area of strategic investment for IT organizations [2].

Big Data are critical to students' current study and future career; hence many schools are training Big Data to students. However, it is extremely difficult to teach them because: First, manipulating data sets often requires massively parallel software running on tens, hundreds, or even thousands of servers. Second, there is no specific Big Data course in most schools. Many instructors met a lot of challenges when they teach Big Data to students. The challenges on teaching and learning Big Data include analysis, capture, search, sharing, storage, transfer, visualization, and privacy violations.

In this article, we present a unique way to teach Big Data in networking and image processing courses. We develop three levels' projects to students via three phases. They are initializing project, designing project, and comprehensive projects. Initializing projects ask students to test basic concepts and check the results. They are normally interesting projects with good visual effect, such as the simulator for networking. This kind of project aims to introduce Big Data and attract student learning interest. Designing projects ask students to analyze a given topic and then to come up with their own solutions. This type is to train student analytical ability. The

third type is comprehensive project, which has challenge topics and may cover multiple course materials. We ask students to analyze the questions in depth, propose their approaches, test the approaches and improve them. This type is to develop student's creative habit and help student solve real setting problems.

Our projects are conducted in two areas. The first one is web/mobile application in networking course, in which initializing projects and designing project are provided. Student learned the concepts of Big Data and how to simplify Big Data from complex networking to a visual computer program. Then we set comprehensive projects in the course of image processing. We used novel image based rendering algorithm with user intervention to generate realistic 3D virtual world in this phase. Students' learning outcomes are significant.

2. Teaching Big Data Based on Three levels of Projects

The literature highlights the importance of hands-on activities in the teaching of technologies [3]. Hence we trained students Big Data by Projects. We assigned three levels of projects in three phases from easy to difficult.

2.1 Phase 1: Introduce Concepts of Big Data with Initializing Projects.

Big Data are critical in Computer Science not only because they are emerging technology, but also they are fundamental for students' future career. Some Computer Science scholars have generally gravitated toward introducing easy content under the assumption that the students would be more receptive to it. It is not true. If the goal of teaching Big Data is just to introduce the basic concepts, it would be an easy task by simplifying the course. However, this could make students, especially those in computer science major, get bored easily with those trivial and superficial contents. Moreover, this teaching strategy prevents students from grasping the fundamentals concretely. To instil the joy of Big Data to students, we demonstrated interesting cases by assigning initializing projects to stimulate students' learning interest.

When we taught Computer Network courses, we studied the characteristics of wireless devices including laptops, iPads, iPhones and Android Phones. In order to consistently create an enthusiastic learning environment and facilitate student's success, we applied simulator as a tool to introduce and simplify Big Data in networking. In particular, we set initializing projects to introduce Big Data to students. We taught students to conduct simulations, which are acts of imitating the behavior of a physical or abstract system, such as an event, a situation, or a process that does or could exist [4]. Some scholars [5] consider simulations as a perfect educational technique that creates learning by reproducing all or part of an event or situation. Theoretically, simulations could be created for any number of topics, courses, or programs in education. Some more popular simulations are offered in various academic programs including business, health care, and transportation. Technology advances allow individuals to design self-placed simulations in their classrooms with limitless options. We designed initializing projects via simulators for mobile networking in our networking courses.

In the projects, we taught students to simplify big network data by simulators. Figure 1 is the real network topology and figure 2 is the graphical interface of the designed simulator. When we introduced Big Data, we presented the scenario of connected network devices illustrated in figure 1. Since many modern and popular devices are used in the scenario, it makes the class compelling and retain students' attentions. High volume data are demonstrated from different aspects, such as their structures and transmissions among the network devices including their structure, transmission, and representation under the network devices. Then we introduced how to retrieve the critical content from the Big Data, such as IP addresses, locations, the resource capabilities [6]. Afterwards, we instructed students to practice manipulating Big Data through hands-on projects. Students were guided to allocate the resources to the mobile devices by solving linear equations. We

pinpointed areas where students can add virtual computers based on the properties of the heterogeneous devices, in order to increase the number of equations. This is the way to simplify the big network data. Students later implemented the equations by programming and the results are displayed in the simulator. This provided undergraduate students a unique opportunity to use experimental technologies to be adaptively involved in learning complicated Big Data problems and understanding the abstract concepts.
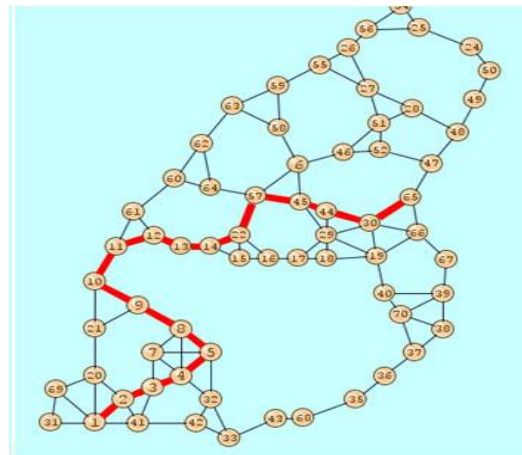

Figure 1   Network Scenario

Figure 2   The interface of simulator

2.2 Phase 2: Train Students' Analysis Abilities with Designing Projects

Marc Prensky[7] created a powerful summary when he said games offer fun, play, rules, goals, interactivity, outcomes, feedback, conflict, opposition, problem solving, structure, flow, motivation, and pleasure. With such a list of benefits, it is a good idea to use smart phone for teaching in the classroom.

 We taught the environment of Android development. Then we assigned projects to ask students to design Apps for Big Data. App Inventor for Android is a new visual programming platform for creating mobile applications (Apps) for smart phones. It was developed at Google Labs by a team led by MIT. Students do not write code to developed apps in App Inventor. Instead, they designed tools to visualize the App by using block based GUI to directly control the App's behaviors through interlocking components. App Inventor aims to develop intuitive tools that facilitate novices to program in an enjoyable manner. App Inventor lets students create apps for smart phones. Given the popularity and ubiquity of mobile phones among today's generation of students, App Inventor seems to hold a great potential for attracting a new generation of students to problem-solving thinking to handle Big Data.

 Students found App Inventor very accessible and they learned how to develop Apps of their own design quickly. Though the App looks simple, it actually incorporates a large amount of data with different formats (e.g. images, sounds, labels, etc.), and involves considerable control logics. Hence App is able to let students focus on problem solving on handling the big data rather than coding syntax. We asked students to design some

very interesting App projects. For example, we assigned the students to develop an interactive map of the attractions in Paris. When an attraction is clicked, its corresponding information will be displayed. Figure 3 shows the logic design of the App. Figure 4 shows the interfaces on a virtual cell phone.

App is a good tool to develop students' problem-solving ability since it is not only easy to follow and reproduce already written apps, but also straight forward to develop completely new Apps based on the principles acquired through the tutorials and demonstrations. Students progressed quickly from writing "Hello Kitty" to develop Apps using database, interactive maps, client server communication, and other advanced concepts. Thus they know how to manipulate Big Data, even when they encounter problems. Students were able to apply their programming skills to new types of problems including databases, client-server communication, images processing and algorithms.
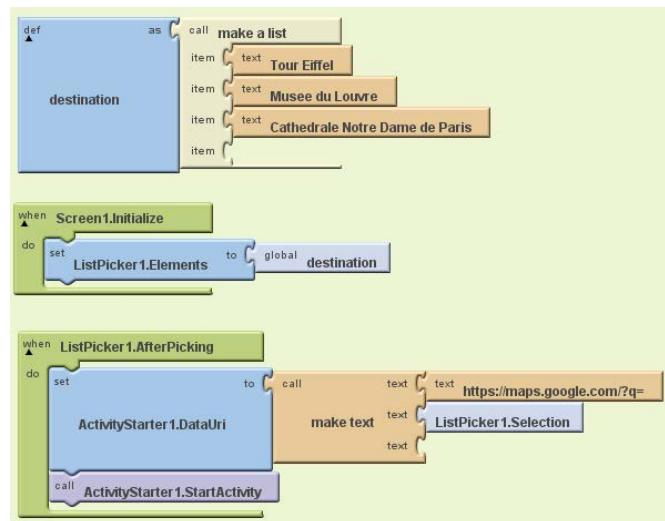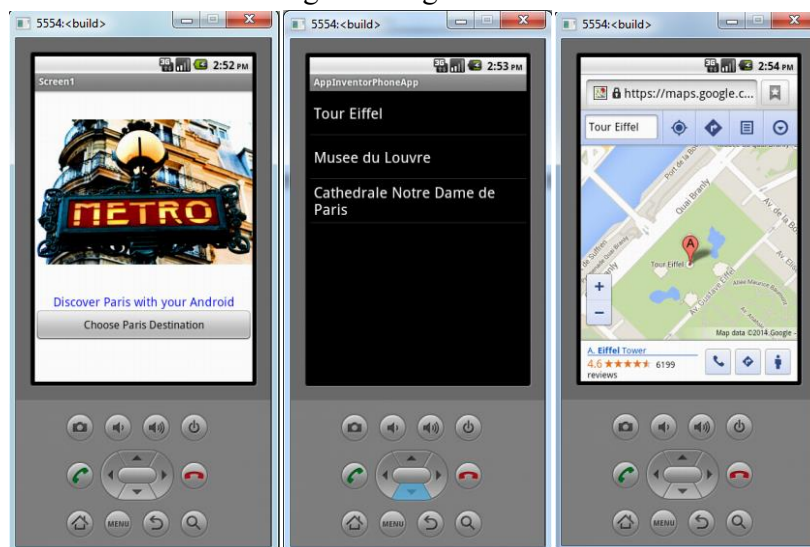

Figure 3 Logic blocks

Figure 4 Interfaces on a Virtual Cell Phone

2.3 Phase 3: Develop students' creative abilities and help students develop research abilities by comprehensive projects.

This is the third phase to train students Big Data. We proposed an interactive system to operate on big visual data that supports online picture sharing or virtual 3D world navigation when we taught Interactive Media. Students got involved of the whole process of system development, such as coding, online image editing, and 3D model designing.

With the explosive growth of Internet and web-based cameras, billions of photographs are uploaded to the internet every day. The massive collections of imagery have inspired a wave of different applications on such

large visual data. Part of the excitement in these areas is due to the facts that images are easy to take nowadays everywhere from our daily devices, like cell phones, tablets, and the efficient online access via WiFi or any phone network. Imagine building a virtual 3D world by taking the advantage of these large online images, such as the Google street view databases or the Flickr image collection. This system can provide virtual environment and immersive experience that allows users to walk freely in a re-constructed virtual world and view the scene from any arbitrary perspectives. In addition to its virtual reality value, as a photo warehouse, such system can also support large visual information. For example, for a travelling resort, people often take many pictures during the trips. However, sometimes the taken pictures may be less than satisfactory, such as the background scene is not fully captured or occluded by some objects. Some photo editing tools are available to improve the images. However, it could be a pain to modify the picture directly without any extra information, which often introduces noticeable artifacts. Things can become much easier, if there are additional available pictures taken from the same location at similar time. In such a way, travellers can share their experiences and enrich their photo collections from the large visual data.

We assigned students with comprehensive projects, which are on image retrieval, localization and reconstructing 3D geometry from a large, unordered collection of online images on landmarks and cities[8][9][10]. We asked students to analyze the questions in depth, propose their approaches, test the approaches and improve them. Because students have experience from the first two phases, we asked students to use image feature descriptors, such as SIFT or SURF, as the cue to identify similar images for clustering. Then based on the detected feature correspondences across multiple views, the scene geometry can be approximated estimated. The use of real photos not only supports realistic image synthesis with little user intervention, but raises the important issue of controlling and altering the representations. The students were really interested in the projects and happy to present their work to the instructors. Many results have demonstrated that, through training, students have developed the ability to use tools to render realistic view of novel images efficiently and accurately.

 The projects of this phase present an integrated research and educational program with two goals. The first goal of the phase is to produce new technologies on intuitive and interactive pictorial editing tools that allow undergraduates to manipulate and alter large visual data directly in high dimensions or temporal domain. The second goal of the phase is to expose the cutting edge technologies in Big Data processing, especially for visual data clustering and reconstruction to undergraduates, which can stimulate student interests in the related fields and promote their pursuit of careers. This phase is not only undergraduate oriented as many available software tools can be used straight away, such as the image matching APIs, 3D transformation tools, but also requires students to explore the core techniques and develop novel solutions on efficiently manipulating large visual data. During the phase, students had the chance to learn those well-established algorithms and state-of-art Big Data technologies in image matching, 3D graphics, and data visualization. Figure 5 is an example that shows the process to reduce the Big Data to represent a tree to much smaller data that represents the outline of the tree.
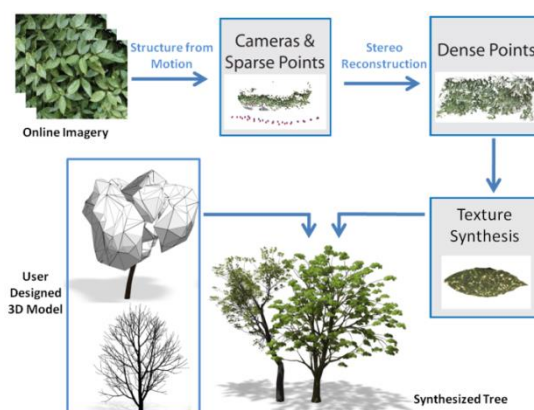

Figure 5 User Editing for 3D Scene Reconstruction: A Big Data application of 3D Tree Synthesis

3. Conclusion

Big Data are very important yet very difficult to teach for students. In this paper, we proposed an effective way to teach Big Data to students. We do not merely mechanically introduce the concepts of Big Data. Instead, we use concrete projects to illustrates Big Data to students gradually through three phases. We assigned students relevant projects to train their skills on handling Big Data, train students' abilities to analyze questions of Big Data, and develop students' creative abilities and their abilities to solve real setting problems.
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Analysis Of Working Conditions Of Support Staff In Public Secondary Schools In Nyamira County, Kenya.

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Abstract

Secondary school support staffs are less satisfied with their posts in general, their contracts and conditions of employment, working arrangements for their post, training and development opportunities available to them are always demoralizing them. Going by the foresaid conditions of work, this study was set to analyze of working conditions of support staff in public secondary schools in Nyamira County, Kenya. The study adopted a descriptive survey design.   The specific objective of the study was to: examine the working conditions of the support staff in public secondary schools. The study population consisted of 170 public secondary schools, 170 principals, 172 deputy principals and 170 BOM chairpersons with 1020 support staff, totaling to 1532. Simple random and stratified sampling techniques were used to select 16 secondary schools, out of which one principal, six support staff, one deputy principal and the BOM chairperson from each of the sampled schools were selected, making a total sample of 144 respondents for the study. The study established that support staff in Nyamira County work under very poor conditions. The findings reveals that support staff motivation depends on the working conditions set by the principal in a school also influence workers motivation to work. The study recommended that there should be salary increase to support staffs and that the yearly increment should be effected considering the fact that they were few and were doing too much work. Principals should avail adequate working tools.

Key words: Analysis, Public Secondary School, Staff Motivation and Support Staff

Introduction

Secondary school principals are charged with the responsibility of running schools by addressing themselves to curriculum and instruction, school community relationship, finance and business administration, staff personnel, pupils and school plant tasks (Nakpodia 2006). Hoy and Miskeel (1992), maintain that at the building level, the principal is usually the key figure in fostering shared governance within the school. Principals not only have increased responsibility and authority in school programmed curriculum and personnel decisions, but

also increased accountability for a student and program success, while doing this the principal should work on ways of motivating the workers to enable them to perform their jobs.

The main tasks of the school principal are to interpret national policies, execute curriculum programs, comment on students, teachers and support staffs' welfare, equipping physical facilities and finances, inducting and retaining school community relations (Mwaoria 1993). For the smooth and effective running of a school, the principal needs to gain the support and commitment of both professional and support staff (Ministry of Education and Human Resource Development, 1999). Principals should motivate and encourage all staff to feel they are part of a team with a common mission. Welch (2006) observed that money, recognition, training, worker qualification, attitude and experience are the basic tools required to motivate and retain top performance. Welch further observed that it is easier to manage the financial and material components of any organization than to manage the human component. They insinuate that "it is easier to manage even animals than to manage human beings" (Nakpodia, 2006; Peretomode, 1991; Peretomode, 2001; Ubogu, 2004; Emore, 2005; Ukoshi, 2004). Thus, in the school system, the school principal, is confronted with numerous problems posed by teaching staff, support staff and students.

In England and Wales, secondary school support staff were less satisfied with their posts in general, their contracts and conditions of employment, working arrangements for their post, training and development they had received in their role, and training and development opportunities available to them (Martin, 2008). Nakpodia (2010), revealed in his study on human resources in schools in Nigeria that conditions of work impact positively on performance of support staff.

Sagimo (2002) maintained that employees and managers have to work in harmony, better cooperation and understanding in order to increase their productivity. It is therefore worth noting that every teaching institution needs not only the teaching staff, but also a motivated support staff to assist in running other services at the school (Bakhda, 2004). Republic of Kenya (2006), asserts that to ensure staff satisfaction and effective utilization of the available human resources for increased productivity, the working environment and conditions of service must be conducive and attractive.

In Kenya employees who are skilled and semi skilled end up securing employment in secondary schools however, poor terms and conditions of service lead to poor morale (Republic of Kenya 1999).

Olayo (2011) maintained that to maximize employees output; they need to be comfortable both at work and home so as to minimize stress and stressors. Every person has the right to fair labour practices including fair remuneration, reasonable working conditions, a right to form, join or participate in the activities and programmes of a trade union and a right to go on strike (Republic of Kenya, 2010). Though researches on principals has been studied and proposals made, a gap still exists regarding the leadership styles and motivation of support staff that play pivotal role in making schools achieve their objectives. Support staffs in Nyamira Sub-county's public secondary schools are reluctantly playing their pivotal role compared to their counterparts in Kisii and Gucha sub-counties (Nyamira District Education office, 2012). It is therefore necessary to assess the relationship between the principals' leadership styles and motivation among support staff in public secondary schools in Nyamira County, Kenya.

The quality of environment in work place determines the level of employees' motivation, subsequent performance and productivity Leblebici (2009). Ademokoya (2006) carried out a study on influence of working conditions on the performance of sign language interpreters and teachers of deaf students in Oyo state, Nigeria. Findings showed that poor working conditions such as delay in promotion and salary payment and unattractive office accommodation have significant adverse influence on working performance of both teachers and interpreters. Hours expected to work, annual wage and job insecurity play a vital role in the association between health- and work –related performance for both work attendance and self reported work performance in Australian working conditions (Holden, 2000).

Lavy (2002) found that rewarding Israel teachers and support staff based on school average performance rather than individual performance increased test scores and participation in motivation examinations. Kahya (2007),

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in a study on the effects of job characteristics and working conditions on job performance showed that there were substantial relationships between employee performances with both job grade and environmental conditions. Poor work place conditions result in decreasing employee performance. This was supported by Nyangori and Nyonje (2010), who revealed in their study that education and training are needed to successfully run micro and small enterprises as the entrepreneurs with more education and training performed better than those with lower levels of education.

Ngala and Odebero (2010), study on motivation of teachers by head teachers in Eldoret Municipality revealed that there exists a positive relationship between teacher- motivation practice and pupil achievement in Eldoret Municipality. Deci (2000), in his findings revealed that motivation of teachers influence their performance at various levels. When their motivation level is low, their performance declines and when their morale is high, their ability to perform is also high. There was a gap here which needed to be filled since they looked only at motivation of teachers and not on support staff by principals. Wohner (2010) observed in a study that rewarding employees make them feel appreciated and give them a sense of value. In addition rewarding employees gives them motivation to keep their level of performance.

Gogo (2010), argued that pay package is a critical component of staff development. Good pay may mean low staff turnover which may result in improved services. Many employees believe in good salary and allowances such as house, transport and medical. Research studies indicate that fringe benefits such as subsidized meals, housing, transport and assistance with school fees can greatly increase teacher loyalty and job performance (Simatwa, 2010). Promotion plays a critical role in staff development, motivation and in enhancing performance. Promotion in any organization is aimed at influencing the achievement level as people work effectively and efficiently to be promoted (Jabuya, 2011).The study concurs with that of Vail (2005) as cited in (Jabuya, 2011) whose findings on the influence of promotion on performance concluded that support staff appreciate a professional career that allows them to grow.

While the literature studied underscore the importance of training and motivation, none of them looked at the influences of principals' leadership styles and motivation among support staff in public secondary schools. The respondents in the reviewed studies were teachers while the current study had included support staff as its respondents.

In the school system, the principal is accountable for the management and motivation of the support staff within the school. However most of the workers are not motivated to work because whenever their schools performs well, it is only the teachers who are congratulated, taken for trips, given awards for good job done and being appreciated. Support staff members are minimally recognized not only by stakeholders but even by their school principals. Support staff members are faced with poor working environment such as delayed salaries especially during the third term of the school calendar as the school management claims they had run short of funds. Support staff members also suffer lack of medical cover, lack of working tools and protective gears when at work. In addition support staff also lack training opportunities, receive less sick leave than teachers although they are exposed to similar health risks at work, not sure of pay progression, not being paid during school holidays. As a result of poor working conditions most support staff are not motivated to work yet they are expected to come to work very early, be innovative at work place, they are also expected to love their jobs and to improve their school performance. This study sought to analysis of working conditions of support staff in public secondary schools in Nyamira County, Kenya.

Objective Of The Study

This study focused on achieving the following objective: to analyze the working conditions of support staff in public secondary schools.

Research Methodology

The study used descriptive survey research design. The major purpose of descriptive research was description of the state of affairs as they exist (Kombo& Tromp, 2006). Orodho(2003) defines descriptive survey as collection of information by interviewing or administering a questionnaire to a sample of individuals. It is used to gather data from a large population at a particular point in time with the intention of describing the nature of existing situations. It can be used when collecting information about people's attitudes, opinions, habits or any of the variety of education or social issues (Orodho&Okombo, 2002).

Kothari and Garg (2014) define descriptive research studies as those studies which are concerned with describing the existing characteristics with specific predications, with narration of facts of a particular individual, or of a group or situation. Descriptive survey design was chosen for this study because it gave the opportunity to assess the relationship between the principals' leadership styles and motivation among support staff in public secondary schools in Nyamira County, Kenya.

The locale of this study was in Nyamira County. The Latitude and Longitude Nyamira County is 0º56′S34º93′E respectively.

The target population comprised of the 170 secondary schools in Nyamira County, 1020 support staff, 170 principals, 172 deputy principals, 170 BOM chairpersons, making a total target population of 1532. This was the total population of support staff members, principals, deputy principals and BOM Chairpersons in the Nyamira County.

Kerlinger (1973) indicated that a sample size, 10% of the target population is large so long as it allows for reliable data analysis by cross tabulation, provides desired level of accuracy in estimates of the large population and allows for testing for significance of differences between estimates. Kothari et al (2014) observed that the size of the sample should be determined by a researcher keeping in view the nature of the universe. Universe may either be homogenous or heterogeneous in nature. If the items in the universe are homogenous a small sample can serve the purpose. This study therefore used 10% of the population because of the large number of the study population.

Stratified and simple random sampling as in table 1 below was used to select 16 secondary schools, of which a principal, six support staff, a deputy principal and BOM chairpersons comprised the sample. In total, there were 144 respondents for the study. The BOM chairpersons are active participants in the school culture, are currently involved in school management, they have adequate time and this research is based on the principles of positivism.

| Sub-County	Total Public Sec Schs	Sample Size	Total H/T	Sample Size	Total DH/T	Sample Size	Total BOM Chairpersons	Sample Size	Total Support Staff	Sample Size
Nyamira North	43	4	43	4	44	4	43	4	258	24
Nyamira South	44	4	44	4	44	4	44	4	264	24
Masaba North	32	3	32	3	32	3	32	3	192	18
Manga	28	3	28	3	29	3	28	3	168	18
Borabu	23	2	23	2	23	2	23	2	138	12
Total	N=170	n=16	N=170	n=16	N=172	n=16	N=170	n=16	N=1020	n=96

Table 1: Sampling Frame

Results And Discussion

According to the objective of establishing the working conditions of the support staff in public secondary schools, the distribution of responses is as summarized in Table 2.

Working Conditions of Support Staff	Principals		Support Staff	
	f	%	f	%
Lack of concern for individual needs by management	14	88	96	100
Lack of terms of service and job descriptions	13	81	96	100
Too much work allocation	13	81	92	96
Poor relations among workers	10	63	90	94
Non membership of trade unions	9	56	86	90
Lack of staff development	8	50	83	86
Lack of team work	6	38	68	71
Lack of commuter allowances	6	38	66	69
Threats from principals	5	31	61	64

Table 2 **Showing Working Conditions of Support Staff as Reported by Principals (n= 16), Support Staff (n= 96)**

Figure 1: shows varied responses from the principals and support staff concerning the conditions of work that prevails in secondary schools. Lack of concern for individual needs by management was established as major working condition affecting work performance of support staff by most (88%) principals and all support staff. Most support staff lack terms of service as reported by most (81%) principals and all support staff. Too much work allocation was also established from (81%) principals and (96%) support staff.
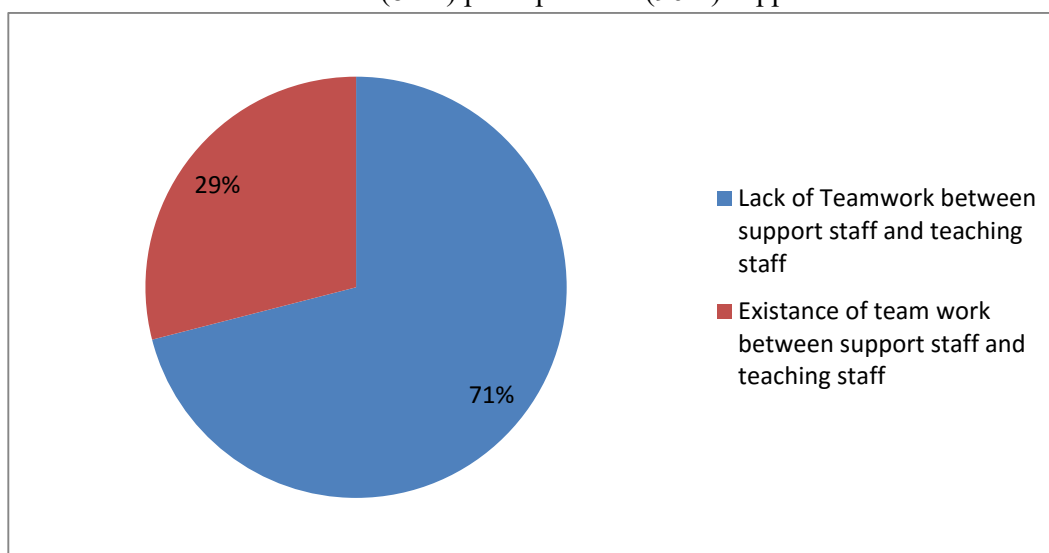

Figure 1: Support Staff Response on Teamwork among Workers in School (n =96)

The study further established that there were poor relations among workers in secondary schools from some (63%) principals and most (94%) support staff. Most support staffs were not members of trade unions as established from (56%) principals most (90%) support staff. Lack of staff development was also established from (50%) principals and some (86%) support staff. Lack of team work was established as not of high

magnitude among principals as only (38%) mentioned its existence in schools but was vastly noted by (71%) support staff. Equally lack of commuter allowances and inadequate house allowances was given by 38% of the principals. This implies that most of the principals may have not seen this as a problem affecting the staff working conditions. On the other hand most (69%) of the support staff indicated it lack of allowances as a factor affecting their working conditions.

The study also established that there were threats from the principals to support staff as mentioned by some (64%) of the support staff.
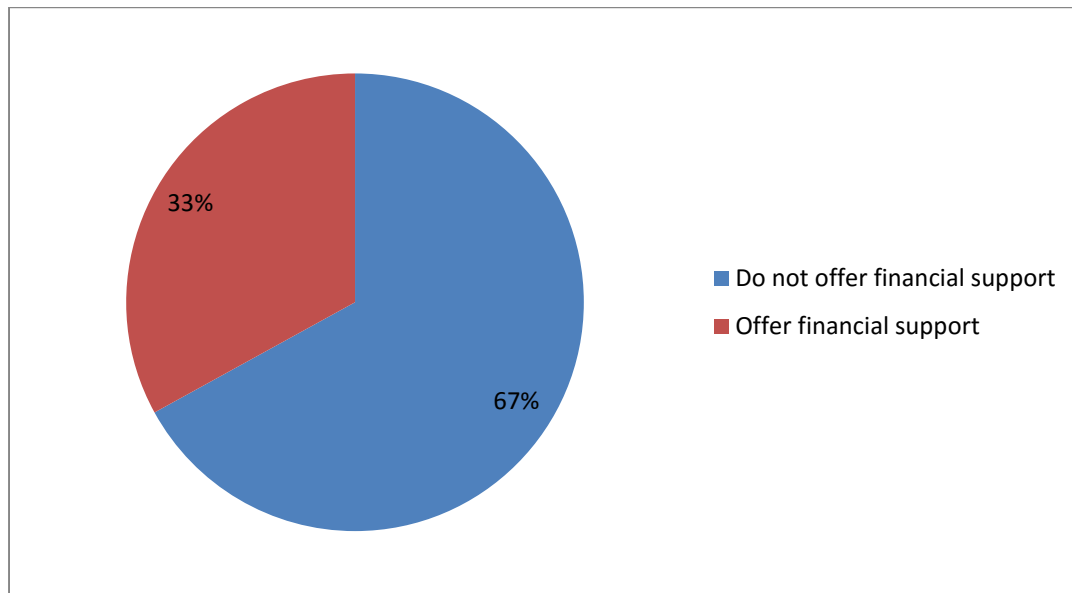

Figure 2: Principal's Response on the Financial Support Staff   (n =16)

The study further established through interviews that most of the principals were not bothered about the welfare of the support staff under them. The principals who participated in the study maintained that some of the support staffs were not genuine with the cases they were presenting and when the principals realized that, they developed laxity in tackling personal issues brought by the support staff. Some principals mentioned how they had been cheated by support staff so as to get money from the school. This they said made the principals to develop an indifferent attitude towards the problems of support staff.

During interviews with the BOM Chairpersons, study established some principals were not showing concern to the plight of the support staff. This they argue was not motivating support staff to perform. One BOM Chairperson stated that;
I have received a number of complaints from support staff in my school that whenever they have problems, the principal was always reluctant to support them especially in cases of funerals and sickness.

The support staff on the other hand during the interview maintained that principals were inhuman and were never having them at heart yet they were the most important part of the schools engine. Some (75%) support staff noted various occasions when they had pressing issues but were denied permission from their places of work to attend to those problems. Equally other support staff mentioned how they were denied financial support by the principals when they were in dire need.
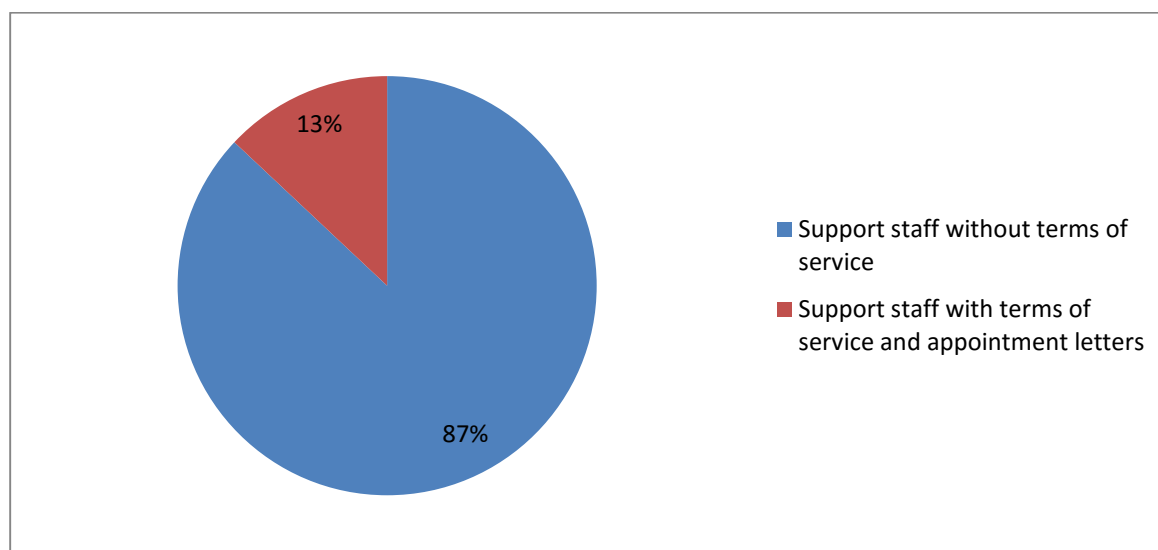
Figure 3: Showing Support Staffs' Terms of Service   (n =96)

The study also established that most of the support staff in secondary schools were lacking terms of service and that majority were working as casual workers or on contract without letters affirming them to such positions. Most (81%) principals indicated they were engaging most support staff on casual basis terms because the government money through Free Secondary Education (FSE) was limiting the number of support staff to be employed yet there was need for more manpower. They further reiterated that the principals were using Parents Teachers Association Development Funds (PTADF) to engage some support staff. Most (98%) principals noted that the principals intentionally avoided giving most support staff terms of service so as to make them accept to do any duty assigned to them by the school administration. As one support staff during the interview stated that:

> *I don't know terms of service or even my job descriptions as I'm assigned duties on daily basis and I'm constantly being moved from one job area to another. I'm disappointment that I'm always kept in the dark of where I will be transferred to next*

Some support staff were semi-literate and could not see the importance of being given job description so long as they were on employment the other issues were not relevant. Some support staffs were of the opinion that they were neglected by trade unions and the government and left at the mercy of the principals.

Too much work allocation to the support staff was also established during interviews with principals. Most (97%) agreed that they were giving too much work to the support staff. They were however quick to explain that this was due manpower shortage in schools. Some (89%) principals also noted that most of their support staffs were on contract and were to be made use of to the maximum because it would not be wise to employ other people to work for them. Some (79%) principals also noted that most of the people they were employing were not complaining of too much work as such they were not aware that they were giving them a lot of work. Also too much work allocation to the support staff was also established during interviews with BOM Chairpersons. Most (97%) agreed that the principals were giving too much work to the support staff. They were however quick to explain that this was due manpower shortage in schools. Some BOM chairpersons also noted that most of their support staffs were on contract and were to be made use of to the maximum because it would not be wise to employ other people to work for them. Some BOM chairpersons also noted that most of the people they were employing were not complaining of too much work as such they were not aware that they were giving them a lot of work

Furthermore, too much work allocation to the support staff was also established during interviews with deputy principals. Most agreed that the principals were giving too much work to the support staff. They were however quick to explain that this was due manpower shortage in schools. Some deputy principals also noted that most of their support staffs were on contract and were to be made use of to the maximum because it would not be

wise to employ other people to work for them. Some deputy principals also noted that most of the people they were employing were not complaining of too much work as such they were not aware that they were giving them a lot of work

Most support staff maintained that they were being made a jack of all trade but master of none. As such they could not perform their duties diligently. One support staff who was employed as a watch man in secondary school explained how he was being overworked at night when he is a watch man at the gate at the same time was expected to cook overnight. Another grounds man claimed that he was expected to be cleaning the compound at the same time being school farm attendance thus feeding cows, milking and taking full control of chicken.

The study further established from the support staff that principals were not taking any action whenever they requested that new workers be added to ease their much work. Some noted that they were suffering certain diseases due to much work they were constantly engaged in. Another support staff maintained that they did not have time for leisure activities because they were working from morning to evening and daily without taking weekends into consideration.

Some principals agreed that they were witnessing poor relations among the workers. They further explained that teachers and support staff were not in good terms and even among support staff themselves. Other principals explained how they had been struggling to ensure unity among the workers within their schools.

Also a majority of the BOM Chairpersons agreed that they were witnessing poor relations among the workers. They further explained that teachers and support staff were not in good terms and even among support staff themselves. Other BOM chairpersons explained how they had been struggling to ensure unity among the workers within their schools.

Furthermore, some deputy principals agreed that they were witnessing poor relations among the workers. They further explained that teachers and support staff were not in good terms and even among support staff themselves. Other (67%) deputy principals explained how they had been struggling to ensure unity among the workers within their schools.

All support staff agreed that they had differences among themselves and this was affecting smooth working environment. They instead blamed their principals for the scenario in their schools as they claim that some of the causes were because of lack of job description. Some also blamed the administration for causing poor relations as they were using divide and rule tactics. These support staff further blamed the principals in their schools for siding with other group of workers against another group. Some (90%) support staffs were blaming poor relations in schools for lack of self-discipline among the workers which constantly leads to conflict among the workers.

Most (90%) principals agreed that all their support staff were not members of trade unions. This they noted was due to many support staff being employed either on casual terms or on contract. The principals also blamed the support staff and trade unions for being reluctant to register members from schools. The support staffs were also not expecting school administrations to force them to register with their trade union (KUDHEIHA) which is their advocate against the employer.
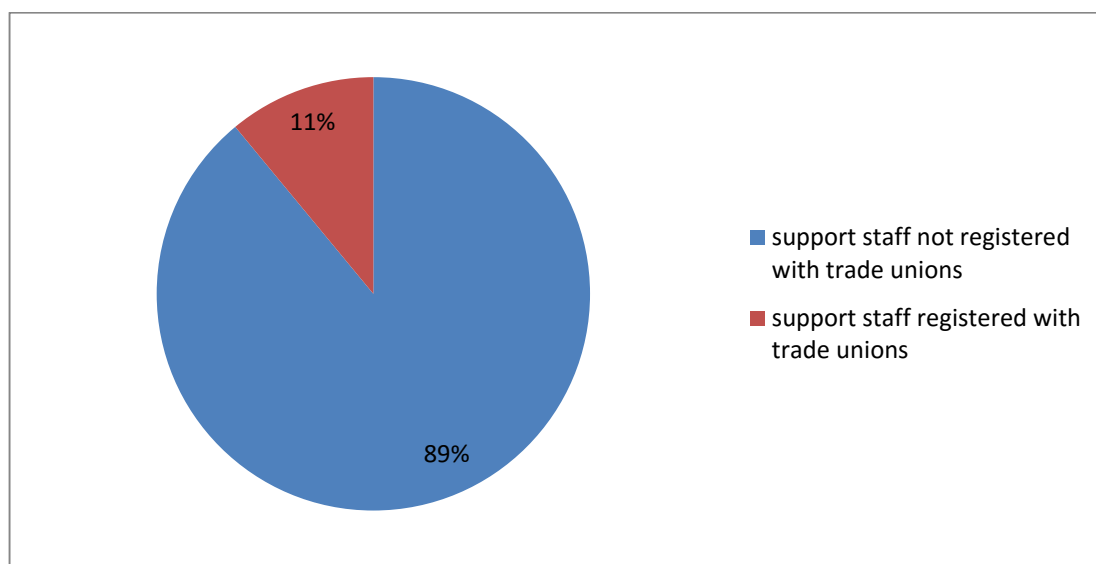
Figure 4: Principal's Response on the Support Staff Membership with Trade Unions (n =16)

On their part, all support staff concurred with principals that they were not registered members of their trade union. This they blamed on the laxity from their trade union offices which had not realized that they were having members in secondary schools. Most support staff blamed their counterparts who were ignorant and illiterate hence were not aware of the existence of trade union and what it stands for. The support staff finally blamed the principals whom they claim do not fully induct their new employees on the existence and importance of trade unions. Most (90%) support staff noted that working conditions were not favorable without trade unions as they had nowhere to turn to when facing high handedness from the school administration. This they noted was leading to high turnover rate of support staff in schools.

Most (50%) principals revealed that they were occasionally taking their support staffs for workshops to enable them improve new skills in their work. Some principals however noted that most support staff does evade workshops even after being sponsored by their schools. The principals further indicated that in some areas like grounds men, they were organizing internal workshops so as to inform them of what they were expected to do. The study also established from the support staff that staff development was lacking in secondary schools and that the principals were not willing to sponsor somebody for well-organized workshops or for further training. They also noted that they were hardly getting internal promotions as such all were stagnant. Some (86%) support staff noted that in their schools staff development was in practice as their principals were constantly talking of lack of funds to sponsor people for further training.
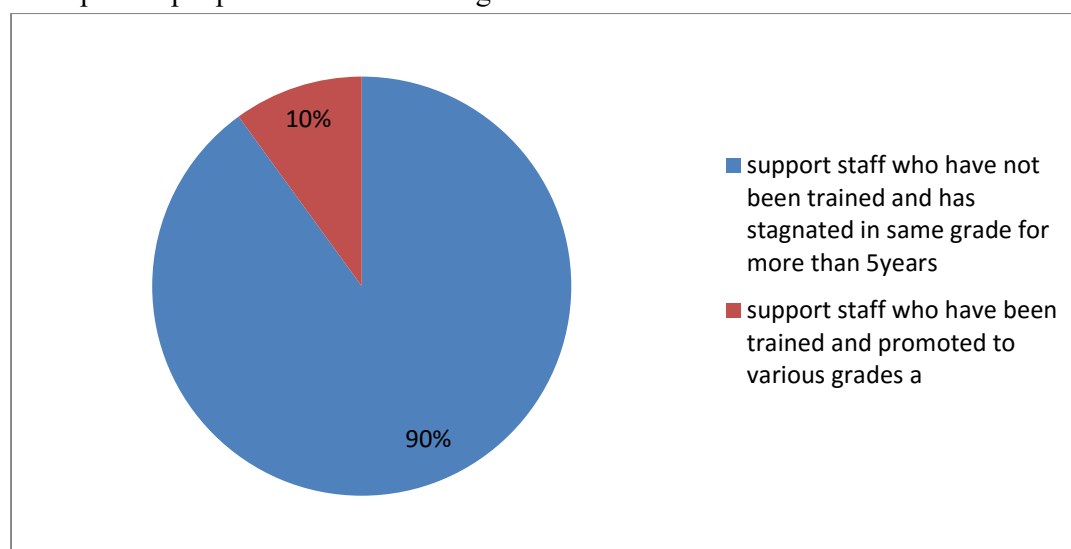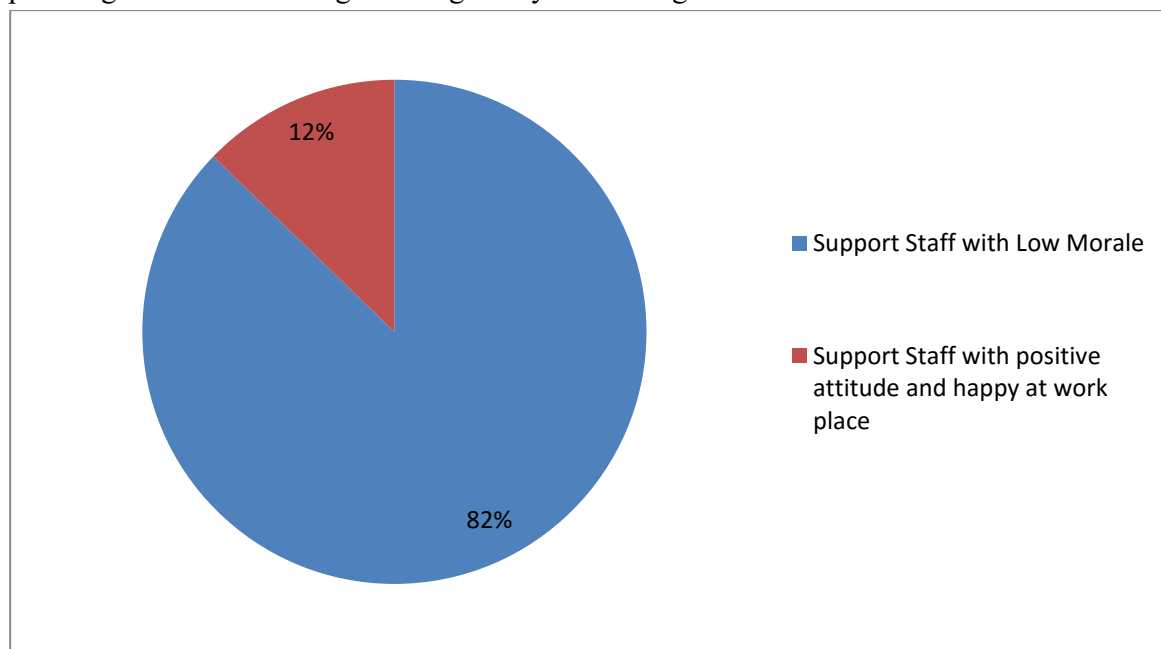

Figure 5: Support Staff Response on the Staff Development (n =96)

Lack of team work among support staff was also established by the study to be in existence among the workers in secondary schools. Most (38%) principals noted that most of them were from the surrounding communities and were carrying village differences to their workplace. The principals also maintained that most of the support staff were having very poor academic achievements and were not seeing the need for team work. Some principals explained how they had made attempts to make the support staff work as a team but they were not successful.

Most (71%) support staff blamed their principals for not being able to create team work in their schools. They further revealed that working was not easy in schools as in most cases people never cared about other persons' duty. They gave examples of security officers in some schools who were leaving school compound when their time reached without waiting for their counterparts so as to hand over. Lack of team work they noted was making it impossible for unity to prevail in schools as such their work was constantly marred with accusations and counter accusations.

Lack of commuter allowances and inadequate house allowances was noted by some (38%) principals. They noted that it was due to inadequate amount being sent by the government to schools. The principals however noted that many times schools were employing the local people who were staying in the villages nearer to the school compound as such there was no need for commuter allowance or housing.

Most (69%) support staff was not in agreement with their principals as they noted that it was the duty of the employer to provide the employee with shelter and transport. Some noted that their morale was low as they were denied their rights while principals and teachers were getting their allowances from the government no matter where they were staying. The support staff noted that with the absence of commuter allowances they ended up feeling tired after walking or riding a bicycle for longer distance.

Figure 6: Support Staff Response on their Morale at Work (n =96)

Some support staff agreed that threats from principals were used to make the support staff work whenever they were seen being reluctant to work. Most (31%) principals however denied that the use of threats existed in their schools. Those who identified existence of threats were quick to note that threats were making support staff not to perform their duties willingly. They maintained that such workers were not productive in the absence of the principals.

Most (64%) support staff were feeling threatened by their principals. They maintained that it was hard for support staff to work well because of fear of being quarreled when they fail to satisfy the demands of principals.

The support staff however maintained that little work was being done in the absence of the school administration. Support staff also noted poor workmanship as they were not working to meet the institutional goals or towards attaining job satisfaction.

Summary, Conclusions And Recommendations

This chapter presents a summary of the research findings, conclusions and recommendations. The study was necessitated by the need to analysis of working conditions of support staff in public secondary schools in Nyamira County, Kenya. The following summary of the findings, conclusions and recommendations were made:

The study established that support staff in Nyamira County work under very poor conditions such as inadequate working tools, low salary and low motivation. Based on the findings of the study the following conclusions were made: Support staff in Nyamira County work under very poor conditions such as lack of training, inadequate working tools, low salary and low motivational programs from their principals. Most motivation were given to teachers and not on the support staff who are equally contributing to the overall school performance. Working conditions affect work performance of support staff and should be checked by the principals because it lowers the workers morale. Whenever a leadership style is being employed, there should be a consideration on how it will affect the morale of the staff. Based on the findings and the conclusions of the study, the following recommendations were made: The study recommends that there should be salary increase to support staffs and that the yearly increment should be effected considering the fact that they were few and were doing too much work. Principals should avail adequate working tools such as gumboots, torches, rain coats, utensils and equipment. Schools should put up houses for support staffs or urge the government to pay them house allowances as a way of motivating them. Principals should provide the conducive working conditions of support staffs to enable them perform their work more effectively and efficiently. The principals should not only buy tools but also improve communication and working environment in the school.

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Deconstrution Of Dichotomies In Toni Morrison's Paradise

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Abstract

In her 1998 novel Paradise, Morrison plays with her reader's desire in terms of gender, race and religion where binary oppositions can be easily constructed in the process of reading. However, as this paper seeks to prove, all these dichotomies are ostensible and false. It is not Morrison's intention to construct a disparate paradise as opposed to all-black patriarchy Ruby with its rigid Christian religion. It is Morrison's intention to invite the readers into the program of deconstructing the dangers of this utopian desire. As the present paper finds out what Morrison really endeavors to critique is dichotomy itself. In the progress of the novel, we can see that simple dichotomies of race, of gender, and of religion are undermined, and set interpretations are shattered.

Key Words: deconstruction; dichotomies; Toni Morrison; *Paradise*.

Introduction

Before publication, Morrison intended the title of her seventh novel Paradise to be "War," which would have indicated the gender opposition and religious factionalism (Kearly 14). And the "war" in the novel seems obvious at first glance, which demonstrates itself in a series of binary oppositions: the Convent & Ruby; Ruby & Haven; female & male; Reverend Misner's & Reverend Pulliam's versions of Christianity; Christianity & African "practice"; two sets of Morgan twins (Deacon and Steward and their grandfather Coffee and great uncle Tea); sisters and sisters-in-law Soane and Dovey; Soane's and Deek's two dead sons; four women who enter the Convent (the abandoning/murdering mother & the abandoned daughter, the sexual exploiter & the sexually exploited).

Because of these seemingly binary oppositions presented in the novel, it was under attack from critics from all sides. Reviewers criticized the rigid and legalistic male-female dichotomy and the unconvincing logic of its war between men and women which results in a formulaic and contrived book (Allen 1998; Gates 1998; Kakutani 1998; Menand 1998). Critics like Geoffrey Bent often see Paradise as a simplistic critique of a patriarchy in which all the men are bad and all the women are good. Bent suggests that "[o]ne of Paradise's shortcomings as a concept is that it's too schematic, a place that's all of this and none of that Morrison's new novel falls prey to this same exclusivity. Virtue and vice seem to have been rigorously sorted along the convenient divide of gender; all the woman are good; all the men bad" (149).

In fact, as the analysis goes deeper, the dichotomies can be proved false. It is not a simple gendered dichotomy of male against female either. It is not a simple racial dichotomy of black against white. Furthermore, it is not a simple religious dichotomy of African religion against Christianity.

1. False Gendered Dichotomy

The fundamental opposition in the novel is between the all-black inhabitants of Ruby and the all-female inhabitants of the Convent. The all-black town of Ruby is dominated by the Morgan twins and their freezing

and rigid vision for their history, while the all-female Convent is comprised of a group of women who have drifted to one house and been welcomed by its only resident, Consolata. These two groups of people are so disparate about their views on their past, their religious practice, and their moral beliefs on community building that they inevitably engage in a kind of struggle. However, the novel may well criticize patriarchal structures that insist on a specific, inflexible hierarchy of power with enforced obedience and silence, it does not so simplistically go for the matriarchy.

From the beginning Paradise defeats the possibility of viewing the Convent as a completely harmonious haven, a conflict-free commune of "sisters." Mavis and Gigi engage in vicious and sometimes violent turf battles, managing "to avoid murder" only for Connie's sake (259). The women bicker, choose sides, and say cruel things to one another, and tensions increase with Pallas' arrival, which seems to jeopardize "the safety available in [the] house" (261). The women are complex individuals who are both good and bad. We are never allowed to fully trust, to believe completely in, anyone. The women of the Convent, who Bent says are purely good, are sometimes horribly flawed—self-pitying, fun-seeking, even violent, and all are participants in the three evils the house-mother Consolata notes: "disorder, deception and… drift The three d's that paved the way to perdition" (222). Indeed, Consolata sees the women as childish and ineffective: "instead of plans, they had wishes—foolish babygirl wishes" (222). Even Consolata, arguably the most promising character, has been driven by lust, homesickness, pettiness and nostalgia, has fallen into alcoholism and self-pity, and is willfully disengaged from the people around her.

At the same time, some of the broken women at the Convent were hurt most by other women: Seneca's sister/mother Jean abandons her, her foster mother refuses to acknowledge or protect her from sexual abuse, and the sexually predatory rich woman Norma Fox further brutalizes her; Pallas' mother abandons her and then betrays her with her lover; even Consolata was stolen from her home country by the woman she comes to adore, the nun Mary Magna.

The Convent, a seemingly female space, contains the remnants of a male embezzler's desires: bathroom fixtures, doorknobs, and ashtrays shaped like genitalia; paintings of copulating couples or women in positions of subjugation; dark rooms whose original purposes are unknown.

On the part of the community of Ruby, the novel indicates that the strict regulation of women's sexuality is not part of the town's heritage. Steward Morgan remembers the story of his older brother Elder, who represents for his younger sibling the exacting moral standards the Morgan men had. Upon his return to the United States after the First World War, Elder gets involved in a fight which has inscribed in his mind forever. Seeing two white men arguing with a black woman whom Elder presumes is a prostitute because of the way she is dressed, he initially identifies with the men. However, he finds himself physically defending her when the white men beat her. Frightened by the consequence of offending the white, he flees away, but he can never forgive himself for fleeing after the fight rather than staying to help the black woman. Arriving home, he chooses to keep his uniform in its tattered condition and asks to be buried in it when he dies. His attitude toward the woman is greatly changed: "Whatever he felt about her trade, he thought about her, prayed for her till the end of his life" (94-95).

Steward is proud of his brother's strict personal moral standard but is unable to relate to Elder's charitable attitude toward the woman: "it unnerved him [Steward] to know [the story] was based on the defense of and prayers for a whore. He did not sympathize with the whitemen, but he could see their point, could even feel the adrenaline, imagining the fist was his own" (95). Steward's judgmental tendency and his aversion to women's sexuality ultimately lead him to abandon his own moral code.

In Zia Jaffrey's 1998 interview for Salon magazine, Morrison responded to the issues of "patriarchy" and "matriarchy" involved in Paradise: "In order to be as free as I possibly can, in my own imagination, I can't take positions that are closed … I think it's off-putting to some readers, who may feel that I'm involved in writing some kind of feminist tract. I don't subscribe to patriarchy, and I don't think it should be substituted with matriarchy. I think it's a question of equitable access, and opening doors to all sorts of things"(Salon Feb. 2,

1998). Indeed, Morrison resists such labels as "feminine" and "masculine" altogether. It is not Morrison's intention to create a paradise where a material, spiritual, and familial qualities can be found and serve the answer to all the problems. In fact, it is her intention to dig out the dangers of this utopian desire.

2. False Racial Dichotomy

The now famous first sentence of the novel: "They shoot the white girl first" (3), which describes the climactic attack of Ruby's men on the Convent women, setting up the racial mystery which lures us into questions: Who at the Convent is white and who is black? To whom does it matter? The long-held beliefs about race and racial characteristics often color the way we understand the world. Playing in the Dark offers a compelling account of what blackness and black characters have been made to symbolize within white literary culture: "illicit sexuality, chaos, madness, impropriety, anarchy, strangeness, and helpless, hapless desire" (Morrison 1992:80–81). In other words, blackness continues to carry its usual label of otherness, unsanctioned passion, and authentic suffering. Certainly, critics have determinedly defined the race of the women in this novel. That would explain why many critics have determinedly defined the race of the women in this novel.

However, such identification does not point out the fact that the character's race matters but that people have been taught by white-dominated American culture to believe that it does. Morrison repeatedly emphasizes that knowing someone's race provides no real information, stating: "It was important to me to demonstrate that [concept] in Paradise, by withholding racial markers from a group of black women, among whom was one white woman… And if I could enforce that response in literature, it was a way of saying that race is the least important piece of information we have about another person. Forcing people to react racially to another person is to miss the whole point of humanity" (Timehost Chat).

Kathryn Nicol considers the racial ambiguity found in Paradise as a strategy for understanding in the novel, suggesting that race is about reading, about the identifier not the identified (102). Indeed, Morrison herself seems to support this claim in her 1998 interview with Salon magazine in which she explains that her father taught her to deal with racism by reminding her "You don't live in that neighborhood... No, you don't live in that imagination of theirs. That's not your home." In other words, racism is about the racist. By adamantly refusing to name which character is white, Morrison also urges those readers who try to solve the text's racial puzzle to become aware of their own participation in the thinking of racial stereotypes. Her aim in her depiction of the Convent women, as she has remarked, is "to write race and to unwrite it at the same time" (Oprah Winfrey Show). The ambiguity of the characters haunts the rest of the novel, disallowing easy judgment individuals or the communities to which they belong.

Morrison here plays with her reader's desire in terms of race and then undermines it. While the reader may attempt to find clues that would determine the race of the women at the Convent, those desires become subverted when the reader is forced to question themselves as well as the narrative. By employing a liberal perspective of individualism, readers can then deny the barrier of racial difference in order to identify with black characters.

3. False Religious Dichotomy

It seems as if Morrison creates in Paradise a nun (Consolata), apparently Christian, whose mysterious powers link her to a non-Christian world. She is bestowed to have the power of "stepping in" to raise the dead. In the novel, Morrison describes how Consolata uses her gift—her ability to step inside other people—to prolong the life of Mary Magna: "Stepping in to find the pinpoint of light. Manipulating it, widening it, strengthening it. Reviving, even raising, her from time to time" (247). But Connie never reveals her stepping in to Mother, knowing that Mother would be appalled by the knowledge that her life was being prolonged by evil, as Connie calls it. The reason why Consolata feels guilty of performing "stepping-in" is that it is quite against what she has been taught by normative Christian principles.

Critics like Therese E. Higgins points out that Consolata assumes the role of the Spanish woman god named Black Virgin of Monserrat (Higgins 132-33). It is true that Consolata's method of raising the dead and healing the women is not in line with the Christian belief, but it is also unsafe to say that Morrison offers an alternative of the African religion to criticize the Christian religion. In fact, Morrison thinks highly of Christian virtues. It is interesting here to note that there is a division between an Old and New Testament God. The God the founding fathers of Ruby seems to follow is indeed an Old Testament God, one who is arbitrary, who sets the rules to be followed. But in Richard Misner's version, intention and action are central and people are responsible for themselves. What the Convent women have at last learned is to love oneself and to love one another, which is just what Reverend Misner is trying to preach: "God loved the way humans loved one another; loved the way humans loved themselves" (146). Most critics agree on the point that Morrison creates the character Richard Misner to express her own stance.

   Another character Morrison identifies with is Lone DuPres, "the most beloved, endearing character created by Morrison since Pilate Dead in Song of Solomon" (Higgins 137). Morrison writes of Lone: "She knew what neither memory nor history can say or record: the 'trick' of life and its 'reason'" (272). Lone practices a Christianity that calls for active participation in the world, and this is what drives her listening: "Playing blind was to avoid the language God spoke in. He did not thunder instructions or whisper messages into ears. Oh, no. He was a liberating God. A teacher who taught you how to learn, to see for yourself. His signs were clear, abundantly so, if you stopped steeping in vanity's sour juice and paid attention to His world" (273). Rather than listening and reading signs, Lone allowed herself to nurse resentment "Had she been paying attention, first to the buzzards, then to the minds of men, she would not be using up all her Wrigley's and gasoline on a mission she hoped was her last" (273), trying to save the Convent women. Again, Morrison does not follow the simplistic logic of denying one religion for another. Paradise may point toward the importance of questioning those narratives and to considering religion with its religious essence and without its religious outfit.

4. Conclusion

As a renowned African-American female writer, Toni Morrison is noted for her examination of the black experience and Paradise is another attempt to for her to bring life to essential aspects of American reality with binary oppositions of gender, race, and religion. Because of these dichotomies presented in the novel, readers are likely to be left to dig out meaning between a male place Ruby and a female place the Convent, between whiteness and blackness, and between Christian religion and African traditional religion. Perhaps the most substantial and intricate work that Morrison initiates does not occur within Ruby and the Convent or even within the text; it occurs, to a large extent, between the reader and the text. The slaughter at the Convent is not the end but the beginning of a new one. As Morrison remarks about Paradise on Oprah, "I wouldn't want to end up having written a book in which there was a formula and a perfect conclusion and that was the meaning and the only meaning" (Oprah Winfrey Show). Therefore, what Morrison really endeavors to critique is dichotomy itself. In the progress of the novel, we can see that simple dichotomies of race, of gender, and of religion are undermined, and set interpretations are shattered. Then real meaning as to the significance of these dichotomies would arise out of every reader's mind.

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Measuring Critical Thinking Through Concept Maps: A Semester-long Experiment in Lifespan Course

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Abstract

Critical thinking forms the core of our knowledge base. Students in higher education need practice and refinement of this skill crucial to help in their personal and social lives. The purposes of this study was to create an opportunity for the students in Lifespan Human Development course (n=20) to learn, practice and enhance critical thinking and conceptualization skills. This was studied using the assignment of Concept Maps, assessing the criteria Basic content, In-depth information, Connections/Comparisons, Theoretical/Holistic Views, Creativity/Novelty. Results showed that students improved in their critical thinking skills over the semester showing three performance patterns–Steady-progress, Inconsistent-progress, and Diffused. Researcher proposes that critical thinking ability to be introduced, practiced, supported, and promoted through deliberate instructional strategies and assessed regularly.

Key words: Concept maps, Critical thinking, Lifespan, Undergraduates, Students,

Introduction

Formal education today largely entails knowledge building through subject matter content coverage. Too often, this comes at the expense of skills building (Tsui, 2002). Instead of focusing too much on what to think, faculty can pay attention to teach the students on how to think. Higherorder cognitive skills, such as critical thinking capacity are invaluable; they prepare individuals to handle and resolve a multitude of challenges that one might face both, at personal and social levels. An individual needs to think critically before deciding on anything. An employer, no matter which discipline/field one might consider, requires some form of critical thinking skill among the candidates. An academician contemplates how to instil this skill among the college-going students. Can we ever teach someone to think critically? If so, how can we best do that? And, then, the next question would be, how do we know if someone actually learned to think critically? Are there any reliable methods of assessing such teaching and learning? If critical thinking is so important in all walks of life, where and when can we begin teaching it? Even before that, of what does critical thinking consist? The purposes of this study was to create an opportunity for the students in Lifespan Human Development course (n=20) to learn, practice and enhance critical thinking and conceptualization skills.

Operational Definition of Critical Thinking:
For the purpose of this study, an operational definition of critical thinking has been framed: critical thinking is a conscious, deliberate, reflective, creative approach for information-processing. This can include analysis, evaluation, and interpretation of existent knowledge combined with conceptual, methodological and focused inquiry. In other words, critical thinking includes the basic tasks of questioning, reasoning, reflection, objective commenting/critique, comparison, and conceptualization.

Statement of the Problem

The current research study plans to address these questions. The basic assumptions therefore are: a) that critical thinking is a skill and needs to be taught, and b) that it needs to be assessed to confirm its learning and practice. With this premise, the current research study was designed with the following objectives.

Research questions:

The current study aims at introducing, enhancing and finally assessing critical thinking skills among undergraduate students in Lifespan Human Development course. The specific research questions are:

1. How to implement the in-class assignment on constructing Concept Maps using resources and readings materials?
2. How to evaluate the assignments using the rubric on a three-point scale on five evaluation criteria?
3. How to assess, evaluate, and compare the students' critical thinking skills at the beginning, during, and the end of the semester?

Methodology

The current study aims at understanding, enhancing, and assessing critical thinking skills among undergraduate students in Lifespan Human Development course during Spring 2010 semester. The sample consisted of 20 undergraduate students at a mid-western university, who were enrolled in Lifespan Human Development course. This section was taught during Spring 2010 semester. The final sample included 3 male and 17 female (n=20) students from different majors and varied in their level of education (freshman, sophomores, juniors and seniors). The assignment was evaluated on five criteria: 1) Basic contents on the topic(s), 2) In-depth information about the topic(s), 3) Connections and/or comparisons, 4) Theoretical and/or holistic views/perspective(s), and 5) Creativity and/or novelty. To enhance the credibility of the grading rubric, two external experts in the discipline were consulted for reviewing it. Both were academicians in higher education and one of them taught the subject for over a decade, while the second expert taught in psychology. For clarity, this section consists of the following parts:

(i)   Sample
(ii) Description/details of the assignment
(iii) Implementation of the assignment/project during the semester
(iv) Assessment/evaluation methods used
(v)   Compilation and computation measures

(i) Sample

The sample consisted of 20 undergraduate students at a mid-western university, who were enrolled in Lifespan Human Development course. This section was taught during Spring 2010 semester. The final sample included 3 male and 17 female (n=20) students from different majors (because this was a General Education/elective course). They also varied in their level of education; some were freshman, sophomores, juniors and seniors. The class met twice a week for 85 minutes each class meeting. In all, the semester ran for 15 plus weeks, including holidays/Spring break, etc. The course was introduced as usual, along with the assignment in focus – the Concept Maps.

(ii) Description/details of the assignment

Educational research has indicated that sustained learning consists of a conceptual framework on which one could base the upcoming information and ideas (Osterhage, 2009). Concept mapping has been used in sciences, engineering, business and medical fields. These maps provide an estimate of prior knowledge, growth in current

knowledge and eventually, room for future knowledge. The author has designed Concept Maps as a learning activity and an assessment tool. The assignment was explained to the students in two places/ways. First was a brief description in the course syllabus and the second were detailed guidelines/instructions posted in Desire2Learn (D2L),   the course management system.

Assignment requirements: The guidelines and rationale provided to the students in syllabus: **Concept Maps:** (15 @ 5 points = 75 points) Concept Mapping is a unique assignment that will make learning of the course content both in an in-depth and holistic exercise. The basic functions of this assignment are:

    a. To provide a clear and distinct view of the concepts learned from the course.
    b. To provide an opportunity to cause logical, reasoning, and analytical intelligences.
    c. To help understand the connections among different developmental concepts and theories explaining human development.
    d. To foster/encourage critical and creative thinking skills through class members' productions.

Every week, Concept Maps will be created during class, after which they will be displayed and discussed in-depth. You can come prepared with a rough draft of your work/ideas and depict it on the large-sized (11"X17") paper. You may use colors, graphics, images, drawings, words/phrases, or any other creative way to make your maps. I will provide the paper and you can bring your own writing/drawing tools. Additional details/guidelines and rubric are provided in D2L. Further details were provided through the online course management system, Desire2Learn. (See Appendix A)

(iii) Implementation of the assignment/project during the semester

Besides the description in the syllabus and in Desire2Learn, a grading rubric, examples of a few models/types, and samples from previous classes were posted for their review. And in-class, a practice (non-graded) Concept Map was conducted to help students understand the logistics. Instant, brief feedback on the technique and contents on these maps helped students understand the expectations of this assignment.

The assignment was spread across the semester. A total of 5 Concept Maps was created, each one about two weeks apart. This gave students enough time for thinking, planning, creating rough drafts and even consulting with peers and Instructor before finalizing their Maps. In-class time, about 20 minutes, was given to draw/create the map. Students were allowed to use their reading materials, rough drafts/sketches, colors, etc. The maps were then displayed in the classroom for peers' reviewing. Students walked around the room and carefully reviewed them. They were then given an evaluation rubric to assess one of the Concept Maps along with two comments listing highlights and suggestions for improvements. Since these peer reviews included students' names, the feedback was not given back to the students, but the Instructor used the reviews for monitoring their critical thinking and assessment skills. This part of the assessment process was not considered/computed for the purposes of the current study.

(iv) Assessment/evaluation methods:
Evaluating methods/rubric:

To help the students clearly understand the requirements and expectations of the assignment, a detailed rubric was created. The criteria were developed to capture the goals of the task and the Instructor's goals for this assignment. These criteria included: a) Basic content, b) In-depth information (hereafter, will be referred to as "In-depth info), c) Connections/comparisons, d) Theoretical/holistic view, and e) Creativity/ novelty. Each of these were graded as excellent, good and room for improvement categories with 3, 2, and 1 points respectively. (See Appendix B) Experts*:*

To enhance the credibility of the grading rubric, two external experts in the discipline were consulted for reviewing it. Both were academicians in higher education and one of them taught the subject for over a decade, while the second expert taught in psychology. An In-depth discussion and analysis of the rubric was conducted before finalizing it.

Samples of this discussion/feedback included:

    a. Would the distances among concepts be assessed? Just thought being able to make a judgment about prototypicality of a concept, or providing a rationale for it might be an indicator of critical thinking.

    b. In terms of creativity, connecting certain concepts in an unusual but creative ways might be another indicator of critical thinking. Would creativity criteria include that aspect too?

    c. It is important to make each cell (on the rubric table) distinct from the next one-that drove my edits more than anything else.

    d. It (the rubric) looks for elaboration of ideas and for insights.

    e. Your rubric does assume that the student is on the right track. What would happen if the student were completely off track? Would that student receive zero (of the rubric) or have the project returned for revision?

    f. Experience with the assignment across the semester (submitting 5 times) supports the use of this rubric.

Proposed plan of action/time plan:

For conducting the study, the following time plan was proposed.

    a. Complete Concept Map 1, followed by their peer evaluation (using a similar rubric).

    b. Complete 5 such Concept Maps over the semester (Feb-April, 2010)

    c. Compare the assignment scores – initial, during and end-of-the semester submissions.

(v) Compilation and computation measures

All the scores from the assignment, which was conducted 5 times during the semester, were compiled into a spreadsheet. The experts were sent a random sample of the maps for review and the scores were verified across the two experts and the Instructor. (In addition, a graduate assistant for this course was also trained and asked to provide additional review/scoring.) These measures were taken to help in the triangulation of the evaluation process and to minimize any biases or inaccurate scoring. Detailed analyses of these maps are discussed under the Results section.

Results

The designing, planning and implementing of the assignment was the first half of the research study. The second and major part of the study was compiling and computing the results. This process required a thorough analysis of the scores considering different variables—in this case, the students, the number of maps, the evaluation criteria and finally, the scores achieved. The sample consisted of 20 students, the assignment was conducted 5 times, the grading was done on 5 evaluation criteria, and the scores were computed out of 15 points per map. In all, a total of 100 Concept Maps were graded and the scores were computed for patterns and further interpretations. The results are categorized into the following sub-sections:

(i)   Comparisons of scores of students on Map 1 with Map 5

(ii) Averages of total scores of all the students on all the maps

(iii) Scores on maps by students – patterns of change/peak points

(i) Comparisons of scores of students on Map 1 with Map 5

On Concept Map 1, the scores were highest on basic content (2.7) (See Figure 1). The two other variables that were similar in scoring were connections/comparisons and theoretical/holistic criteria, followed by creativity and In-depth info. It is clear that the creativity was evident only in 5 (25%) students, while the others scored only 0.5 – 1 points (out of 3 total). (See Appendix B).

This could be explained on the grounds of their varied backgrounds/majors. It could also reflect their level of education, freshman, sophomore, junior and seniors. It was, however, evident that students laid greater emphasis on the basic content and hence did well on that criterion.

Figure 1. Graph showing comparisons of averages from Map 1 and Map 5
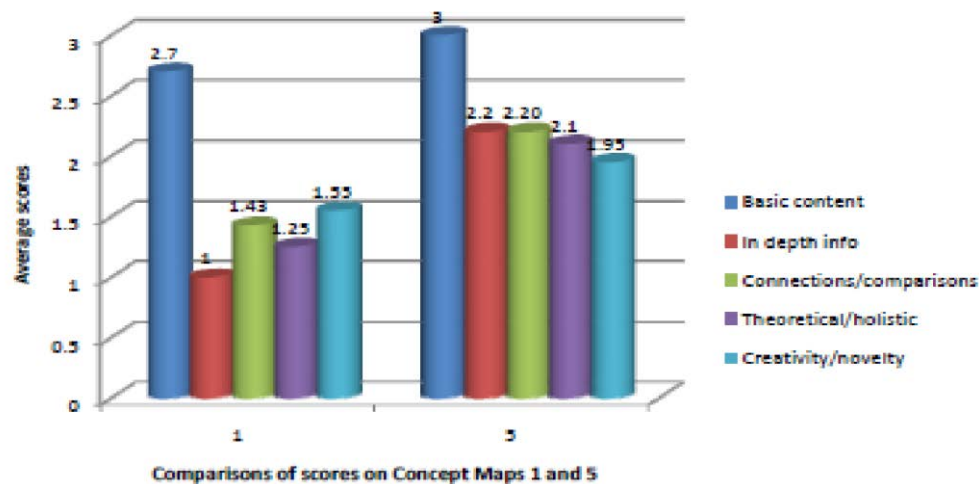
On Map 5, there was a considerable increase on all the evaluation criteria, including the basic content. Figure 1 shows the changes in the abilities of the students, comparing Map 1 and Map 5. The maximum increase was seen on the In-depth info, followed by connections/comparisons, theoretical/holistic, and then, on creativity/novelty. On Map 5 on In-depth info, almost 50 % of the students scored over 2 points (out of 3), compared to 25 % on Map 1. The Basic Content, which was already at a high level (mean of 2.7 out of 3), changed to a full score (3 out of 3). The least developed criterion, creativity, was found to be hard to teach. Those students who already possessed some creativity, improved a little, but, others (over 50%) showed not much change. It might also be true that, since their focus was on the other criteria, like In-depth info, connections/comparisons, and theoretical/holistic criteria, the criterion creativity/novelty was not given much attention.

(ii) Averages of total scores of all the students on all the maps
 The second part of the results section will now compare the total and their averages of the students on the Maps 1-5 (See Figure 2). These scores show the following:
   a.   There was a considerable growth in the overall scores all the students. The average total score changed from 1.59 (Map 1) to 2.29 (Map 5).
   b.   There was a major change in the criterion – In-depth info. It moved from less than 1 (Map 1) to a score of over 2 (Map 5). The growth was steady throughout, except on Map 4, where there was a slight drop on this criterion.
   c.   Theoretical/holistic criterion showed the next highest increase; its growth was small compared to Map 1 and Map 2, but, raised the most by Map 3. For reasons not known, this criterion, along with the other one, connections, dropped on Map 4. Timing of Spring holidays might have been one of the reasons.
   d.   Connections/comparisons also followed this growth pattern – increased from Map 1 to Map 2 and then, to Map 3, but dropped slightly on Map 4, but then, increased greatly by Map 5.
   e.   As mentioned before, the final criterion – creativity, was difficult to change, it only increased from a total average of 1.5 (Map 1) to 1.95 (Map 5).
   f.   And finally, an interesting trend can be noticed on the criterion – basic content, which was scored highest on Map 1, turned to a full score on Map 2, and dropped a little (by 0.25) in Map 3, and even further

(another 0.5) in Map 4. It was promising to see that the scores on this criterion – basic content, were back to a full score (3 out of 3) on Map 5.

Figure 2. Graph showing average of total scores: Maps 1-5
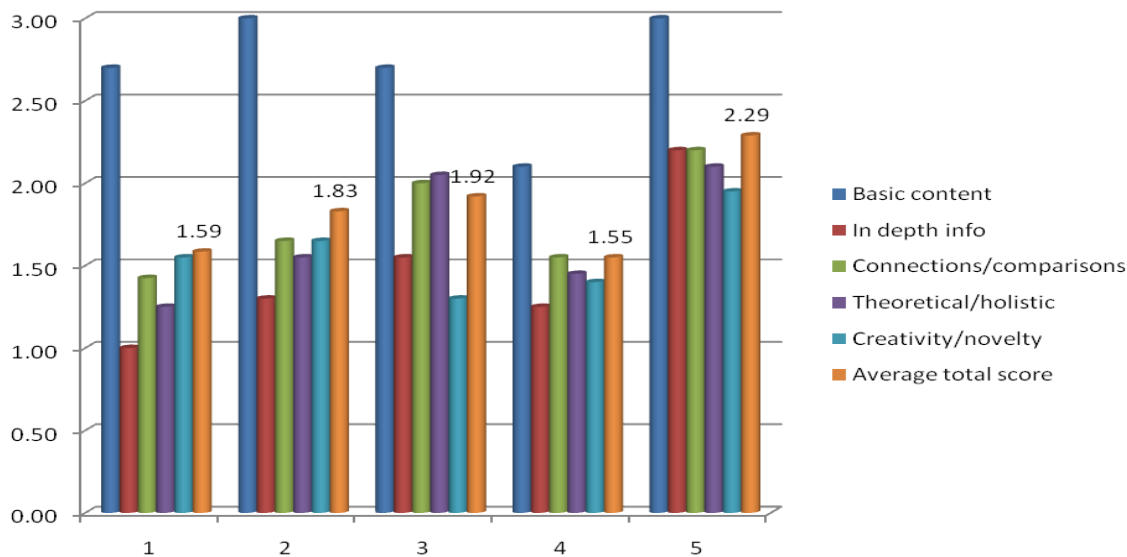
(iii) Scores on maps by students – patterns of change/peak points

Although the overall growth was evident from the graphs above, it should be noted that all students did not change in the same fashion. To discuss patterns of change among students, a sample of them are studied In-depth below. These students' scores are selected to show a variety of patterns in their performance on each Map and on overall scores. One other outcome of this analysis was to discover the peak points in the performances of students. When the scores of each student were arranged and compared over the semester on the 5 Maps, some interesting patterns emerged, that will be elaborated under Discussion. However, these patterns were unique to each student, and hence, were not suitable to generalize to the class. Each of these samples below depicted a distinctive feature in their performance on the assignment.

Figure 3: Graph showing all the maps by criteria/variable of Student # 3
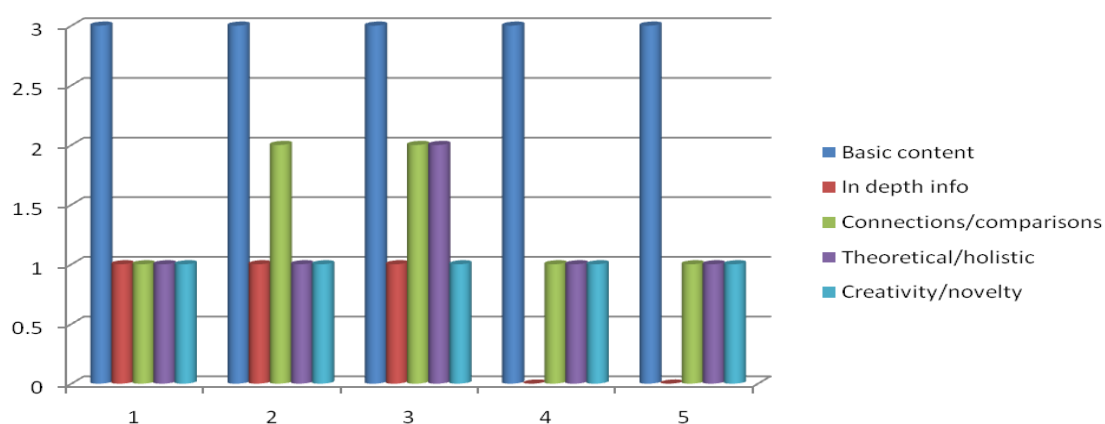
In the above sample, Student # 3 has scored full points on the first criterion – basic content, all through the semester (See Figure 3). The other four criteria, were at 1 out 3 points (on Map 1) and did not change much over the semester, except on Maps 2 and 3. The least scored criterion – In-depth info was always a 1 (on Maps 1-3) and a zero on Maps 4 and 5. The maximum overall score, hence, was on Map #3, when the criteria – connections/comparisons and theoretical/holistic were the highest. In a nutshell, it can be concluded that this student (#3) had the peak point at Map # 3 and demonstrated little change over the semester.

Figure 4: Graph showing all the maps by criteria/variable of Student #10
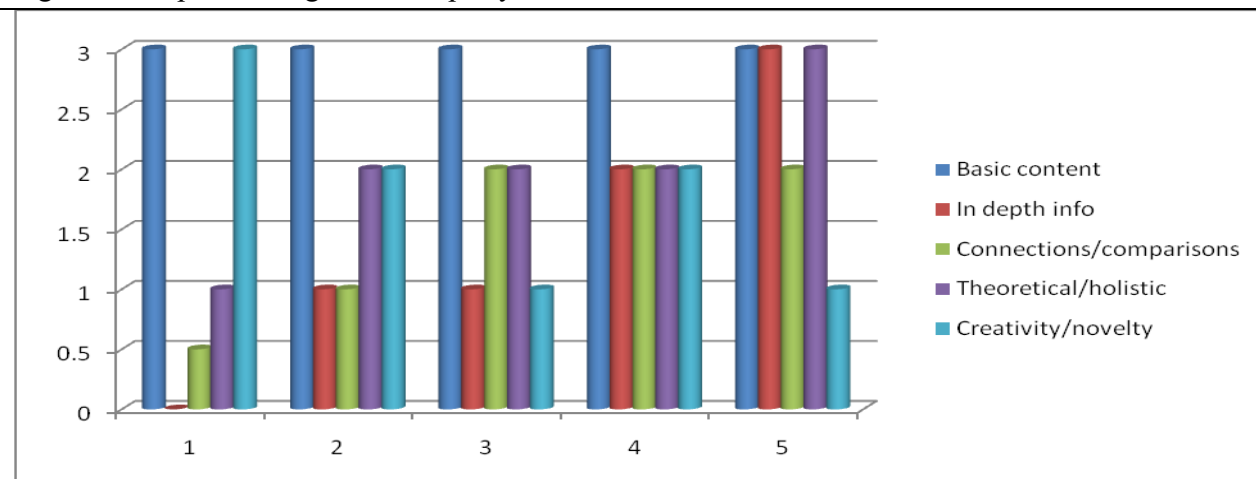
In the above example, Student # 10, showed a slightly different trajectory (See Figure 4). A brief account of this student's performance includes a full score on the criterion – basic content throughout the semester. The most growth was seen on criterion – In-depth information, which increased from a zero to a three. The next two criteria – connections/comparisons and theoretical/holistic increased from less than 1 to 3. On a downward change, the creativity moved from 3 points to less than 1. Overall, the student's peak point was at Map 5, followed by Map 4. In fact, this student's trajectory shows a steady growth in each of the criteria (except basic content and creativity/novelty) showing maximum change by the end of the semester.

Figure 5: Graph showing all the maps by criteria/variable of Student #11
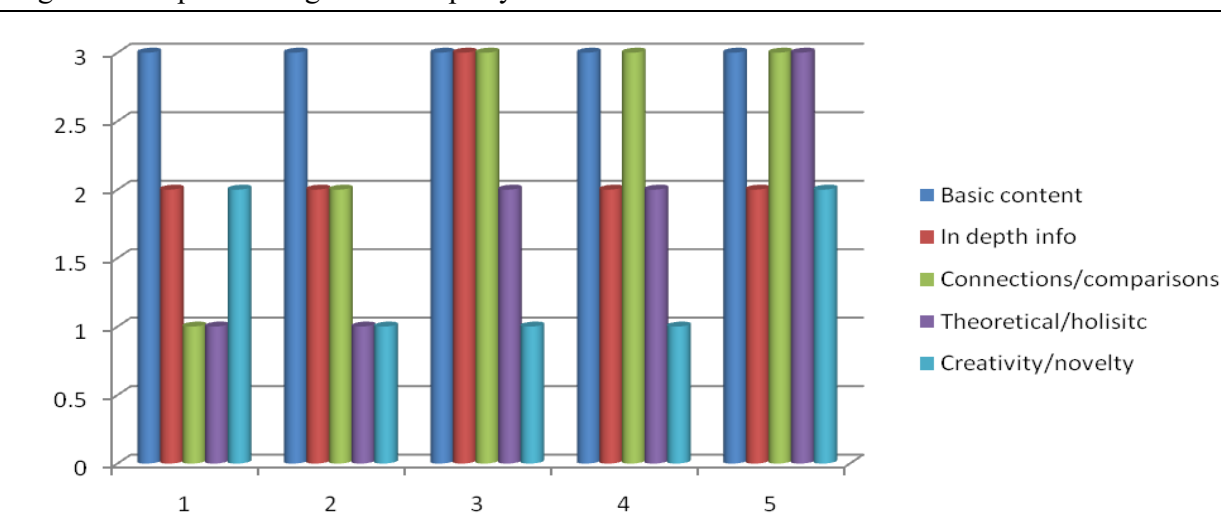
In the next example, Student # 11 portrayed a slightly different arrangement (See Figure 5). As in the previous cases, the criterion – basic content was scored well across the semester for this student too. The criterion – In-depth remained the same over the semester, except on Map 3, when the student scored full points. Connections/comparisons started at 1 point (Map 1), and moved 2 points (Map 2), and then went to a full score of 3 points thereafter. Similar trajectory was noticed on the criterion – theoretical/holistic, where the scores were the same on Maps 1 and 2, but increased on Maps 3 and 4, and finally, further increased to 3 (on Map 5). These two criteria showed a positive change and it was promising to see such progress. Although the maps 3, 4, and 5 certainly demonstrate high scores, the peak point for this student was at Map 5.

The last sample, Student # 20, differed in growth pattern (See Figure 6). This student, who had a total score of 8 (out of 15) on Map 1, went on to score 15 (out of 15) on Map 5. Most steady progress was noticed on two criteria – theoretical/holistic and creativity/novelty. These two were low on Map 1, increased in Map 2, and stayed the same on Map 3 and changed a little (creativity was higher) on Map 4, and finally, excelled in Map 5. The bumpiest changes were noticed on the criterion – In-depth info, where the scores went from 1 to 3, then to a 2, and then, a 3 and finally stayed at 3 (on Map 5). Connections/comparisons were fairly high initially, and fine-tuned further and remained the same from Map 2 onward, till the end. This student's peak point is clearly also at Map 5.

Figure 6: Graph showing all the maps by criteria/variable of Student #20
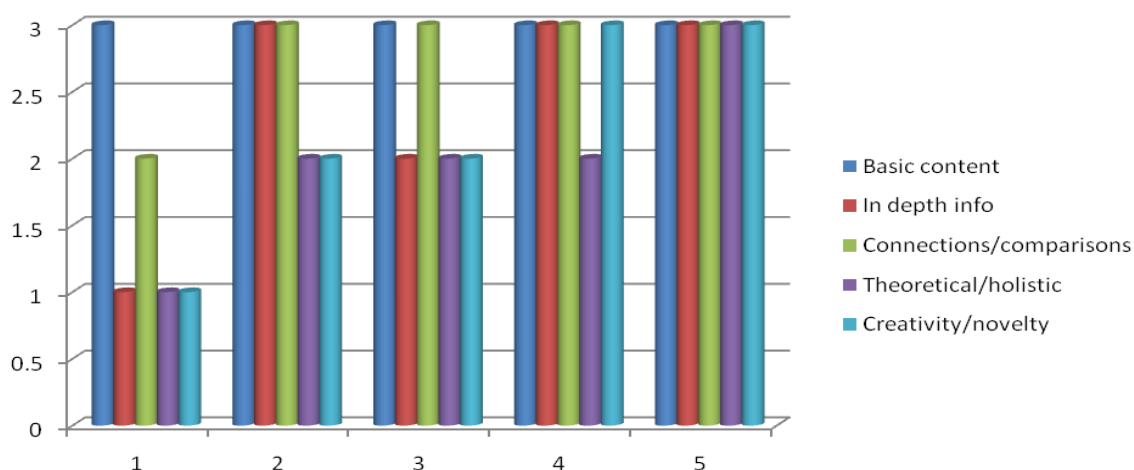
Discussion

From the analyses of the assignment and the explanations of different criteria lead the author to produce the following interpretations. The current section is divided into the following parts for further discussion: (i) Overall performance patterns of the class, (ii) Individual student performance patterns, (ii) Summary and conclusions, (iii) Limitations of the study, (iv) Recommendations for future research.

(i) Performance Patterns: Individual and Overall

Evidence from this study offers hope that mindful efforts by educators can utilize simple assignments like Concept Maps to facilitate and promote students' ability to think critically. Performance of the students during the semester varied significantly showing overall increase in their critical thinking skills. The results have clearly illustrated this fact. The main objective of this assignment was to master the information on Lifespan Human Development, which was accomplished partially through Concept Maps. This had a two-fold purpose.

First was to train the students to decipher the major concepts of the sections/units in the course. The second goal was to provide the students an opportunity to practice critical thinking and conceptualization of the learned content. Students were educated on this new method in the initial weeks of the semester. A non-graded, in-class practice Concept Map helped them to assess their own skill on this task. Instant feedback and elaboration, some samples/styles of maps, a few examples from previous semesters did seem to help. The part of the assignment, where the maps were reviewed in-class by peers did help the class overall.

Conversely, it was obvious that the assignment certainly did not benefit all the students in the same way. As described earlier, each student showed a unique path – some more steadier than others. Not all students progressed on all the five criteria under study. There were basically, three clusters of performance and were labeled based on their characteristic features. Some students had a rocky start but slowly picked up the skill after that. This group, showed a *Steady-progress pattern*. These students gradually improved their overall performance on all/most of the criteria. Approximately 50% followed this pattern. (Student #20 was one such example.) Second cluster of students showed unstable and irregular performance over the semester. This group demonstrated an *Inconsistent-progress pattern*. These students' scores increased and decreased in uneven fashion. This was true for all the measured criteria. Around 35% of the students fell in to this category (Student #10 was one such example.) Finally, the third group's scores were widely scattered and diffused over the semester on all the five criteria. It was difficult to describe their work as progress, since the scores on their Maps were disconnected, with unrelated elements randomly scattered, and coherence and in-depth information lacking. The label Diffused pattern seemed fitting for this group. Among the class, nearly 15% students performed in a Diffused pattern. (Students # 7 and # 8 are two examples.) (See Appendix D) This explains the difficult level, unpreparedness and unfamiliarity of students on this task. This could be due to their initial exposure to new assignment, which certainly was very different from what they were used to in earlier and/or similar classes and both inside/outside of the department.

One must remember that the visual complexity of these Maps may not necessarily represent the student's full capacity to learn and master the content. It however, represents the ability to make an attempt and work toward analyzing and synthesizing the contents. The Maps were distinct and varied in their style, complexity, content, and originality. Some Maps were based on the charts, graphs, tables, key words, headings, and any prominent parts of the book chapters and/or other readings. A few other Maps were a combination of different readings, not focusing just on the main points/headings but an overall or holistic meaning of the topic/unit. Some characteristics of these Maps were: organized, connected, coherent, conclusive, systematic, inventive, graphic, and categorize in nature (See Figure 6 for Map 5). Others were sometimes deceptive, segmented, disconnected, unrelated elements randomly scattered and lacked coherence and in-depth information (See Figure 4 for Map 1). Students demonstrated different approaches to compile the information and then depict it on a Map. Only few students actually 'processed' the information before creating a Map. This 'processing' of information required higher level reasoning and critical thinking skills mainly, analysis, explanation, inference, interpretation, evaluation, selfregulation and purposeful reflective judgment (Facione, 2010). Students who spent enough time on this phase (of processing the information) produced complex and in-depth Maps, compared to their counterparts who lacked these skills. Having said that, not all the students who possessed and used these critical thinking skills performed fully well on the Maps. That is because there was another ability/skill that was necessary, creativity. Creativity certainly made a difference in how the information was depicted on a Map. Students' own developmental level, hereditary and environmental factors played a role in what kind of novel ideas one could get during Map creation. Recognizing the variance among students' age, gender, educational level, background knowledge and practice, this assignment supports differentiated learning. And creativity, one of the criteria under study, underscores the differentiation of the assignment (M. Bold, personal communication, July 3, 2010).

Overall, there was a clear association between the appearance of a map and the scores it received. The rubric employed for evaluation supported a qualitative review of the students' work (Bold, 2010). It was noticed that

words were preferred in some instances, while graphics and color were added for beautification. In other cases, the focus was on a creative and decorative image embedded with information. These two styles were distinct in their own ways. The strengths of the Maps were Content and Theory/Holistic View. Since the requirement of the assignment was a thorough understanding of the readings, students mastered the topics under review for designing the Maps. Making Connections was an important criterion and students quickly learned it (since it affected their total score). A weakness that continued to remain till the end was In-depth information. Students seem to have the practice of learning the content at surface level and reproduce it during Exams or similar assignments. Creating a Map demanded a much deeper understanding of the information, which seemed to be lacking among many in the class. As described in Figure 1, the least developed criterion, creativity, was found to be hard to improve. Those students who already had roots of this skill, improved a little, but, others (over 50%)

showed little difference. It could be due to their focus and attention was on other criteria like Indepth info, connections/comparisons, and theoretical/holistic view.

This assignment made the students more alert toward their own learning and, hence, they seemed to work harder and effectively. Showing them a collection of generic models of concept maps seemed to help the students. After the first Map, the Instructor saw the benefit of showing the class a few samples from previous semester. There were mixed feelings about this in class. Some students expressed that it definitely helps to see previous class's work, while others said they rather not see them. But, overall, students did learn and enjoy review their classmates' work. Inclass review and assessment helped them to compare their own work with that of others, and learn some nuances of this conceptualization skill. Oral feedback from the students, during class included, "I have never thought about … (topic) in this way before," "It was cool to see that … (student name) came up with …. (this pattern)," and "looking at others' work helps me understand what I need to improve upon." Comments like these clearly demonstrate that the exercise was certainly beneficial, and that students were thinking critically of their own and others' work. Thinking of alternative solutions to a problem and seeing different perspectives were often considered as essential parts of critical thinking.

(ii) Summary and conclusions

"A concept map should both answer and ask a question" (Vacek, 2009, p. 49). In the current study the Concept Maps were used to answer the question – what is lifespan human development (at different stages)? The question that should be raised in students' minds is – How are these stages and developments compared and connected? The answers that student should be able to derive would be – the developmental process and its nuances. On the whole, it is believed that the assignment met the expectations of the course, seemed to help the students in training them on a new set of skills, and finally, provided some interesting insights into the student learning and teaching of this subject. The researcher believes that educators need to begin their teaching only *after* preparing the students with a proper mindset, most importantly, the skills related to questioning, thinking critically, and doing inductive and deductive reasoning. Dumping loads of content into students' minds that are unable to think critically (in other words, reason, analyze, reflect, and interpret) is an inefficient educational practice (Tsui, 2002). The author firmly believes this notion of teaching the skill rather than mere content in fact, has led to the current research study. "In principle, critical thinking in fact could serve as a predictor of course performance and as an outcome of learning experiences in the course" (Williams, Oliver & Stockdale, 2004, p. 1). Some major conclusions of the study are:

a. It was concluded that the course was conducive to this type of assignment, since it involved conceptualization of contents, and cumulative learning over the semester.
b. It was clear that students needed training and practice in mastering this skill of critical thinking and conceptualization.

c. It can be noted that critical thinking ability can consist of several parts, of which only four criteria were included in this study. The mastery of the information, the criterion – basic content, was the indispensable goal of the course.

d. It was found that there were different patterns of performance among students: Steady-progress, Inconsistent progress, and Diffused. Each of these patterns influenced different styles of accomplishment, learning, and functioning.

e. It can be also concluded that conducting this assignment and the study overall was not an easy task. A lot of time was involved in its planning, implementing and evaluating. The most difficult component was to articulate the rationale of the assignment and to prepare the students to begin the training/practice.

f. The current study for sure has made the researcher more alert to the students' needs, learning styles, and techniques of understanding subject. This will help the Instructor to cater to different students in the optimum manner.

The author wishes to continue this teaching strategy (of using Concept Maps) to enhance critical thinking skills among students. The goal is to infuse this method into all the courses and thereby making it a common practice instead of just a one-time trial. So, looking back at where we started (in the Introduction), we do seem to have a few questions answered. Our assumptions turned out to be accurate. Considering the results of this study it is obvious that, critical thinking can be facilitated through educational endeavors. Class assignments like Concept Maps can serve as a good start, not only to master the course content but also to induce and develop critical thinking skills. Then, the next question was about assessment of this new/learned ability. It was found, through this study that this step was not easy. It required rigorous procedure of using a definite rubric that was developed after serious thought, planning and deliberation. The rubric was refined incorporating noteworthy suggestions from the external experts. There are several commercial tests/scales to measure critical thinking, which may/may not apply to every classroom context. It would not be an exaggeration to say that an assignment like creating Concept Maps works well in most (almost all) of the disciplines. So, in essence, critical thinking is important, it has to be taught deliberately, and assessed (to confirm its learning) and finally, expanded regularly. Also, the researcher envisions further expansions of the assignment to address other instructional goals, like communication, demonstration, peer-teaching, and presentation to the class or a wider audience. The final goal (for now) is to train the students to learn to use their critical thinking skills, practice them well during the semester and then, showcase their abilities to a wider audience, be it the class, the department/college, university, state or even national levels.

(iv) Limitations of the study

As in any research, shortcomings are bound to exist. Some of the major limitations of the current study were:

-   The size of the sample was small (n=20), and hence cannot be generalized for a larger population. The class distribution was also uneven (3 males and 17 females), hence comparisons among the genders could not be made.

-   In this course, this was not the only assignment that was designed to promote critical thinking skills. It is hence difficult to separate the cumulative effect of all the exercises conducted during the semester.

-   The level of the student's education (if they were freshman, sophomore, junior or senior), might have played a role in their critical thinking ability. If the study was conducted on a more homogenous group of these levels of students, a comparison might have been possible.

-   The time limit on the exercise was one of the restrictive factors. Since this assignment was part of a course, which was content-intensive (and since Concept Maps were only one of the many other assignments that were planned for this course), only limited time was spent on this assignment.

- Also, this assignment was conducted only 5 times during the semester. Student performance may have been different if this was a daily or a weekly exercise and/or done in groups instead of individually.

(v) Recommendations for Future Research

The common characteristic of research is that while answering some questions, it raises some (other) newer ones. The author, hence, makes the following recommendations for future research. It was found that due to a lack of a pre- and a post measurement of the level of critical thinking skills among students, studies like these have debatable conclusions. It is difficult to determine if the changes, most likely the increases in the critical thinking skills, were due to the instruction and practice or due to natural developmental process of human learning. Unless there is a matched controlled group, how is it possible to know if the teaching strategies made any significant impact? A few suggestions to continue this line of research are:

- Administering the assignment more number of times, eg. as a weekly assignment.
- Include all levels of undergraduates (freshman, sophomores, juniors and seniors), and compare them as individual groups and across the groups.
- Including graduate students and compare them with undergraduates.
- Conducting this assignment alongside other assignments that promote critical thinking skills, such as reflective exercises, role-plays, debates, etc. to determine whether any such combination is more beneficial.
- Comparing males and females, making sure the sample size it large enough.
- And, finally, continuing to monitor these students in other classes to determine whether they have retained any of these critical thinking skills and if so, study how that retention is demonstrated.

The educational goal of developing critical thinking skills is significant as well as challenging. Direct instruction of critical thinking skills is certainly an arduous task, but if persistently continued along the program and at all levels, students in higher education can benefit the most and thereby leave the institution prepared for the real life. Use of simple and yet creative assignments like Concept Maps can help in such endeavors.

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Appendices

Appendix A: Assignment details provided to the students via syllabus and D2L
Appendix B: Concept Maps: Scoring guide/Rubric
Appendix C: Graph showing scores by student for Map 1 and Map 5
Appendix D: Graph showing scores by student and by maps
Appendix E: A sample of high-scoring Concept Map

Appendix A: Assignment Guidelines
Assignment Guidelines provided in Desire2Learn (D2L) **Concept Maps:**

Concept Maps are tools for visual thinking. Your learning will be obvious when it is depicted on paper, and even more, when put into a graphic representation. The concepts or individual pieces of information are stored and viewed by your brain in a certain fashion. Concept Maps give us an idea of such learning and understanding. Concept Maps help you reflect and deepen your understanding of the subject. These exercises are provided for you at regular intervals to improve your understanding of the subject. It is a tangible way of measuring your learning and understanding of the subject. In a nutshell, Concept Maps provide a snapshot of your learning, including the critical thinking and creative experiences.

A few benefits of Concept Maps:

By creating a Concept Map, you are:
1. Helping yourself to check your own learning.
2. Enhancing your understanding of the information that you have learned.
3. Visualizing the connections between the concepts/information in different styles/ways.
4. Facilitating in organizing the new information into the existing knowledge.
5. Improving the clarity of the information under study.
6. Exploring the missing links and finding the gaps in your learning.
7. Improving your creative thinking skills
8. Training yourself in taking visual notes during lectures/meetings, etc.

Prior thinking, planning, and reviewing the information and coming prepared to the class can improve your performance on this exercise. You may even create rough drafts before coming to the class. Reading and reviewing the information and then, analyzing and processing new information will help bring about assimilation and accommodation of knowledge.

The assignment will be evaluated on five criteria:
1. Basic contents on the topic(s)
2. In-depth information about the topic(s)
3. Connections and/or comparisons
4. Theoretical and/or holistic views/perspective(s)
5. Creativity and/or novelty

ps: In each Concept Map, you can include all the readings/materials discussed thus far in the course.
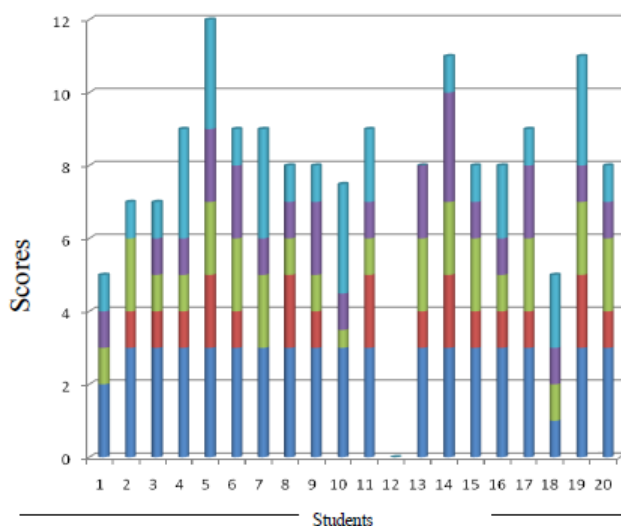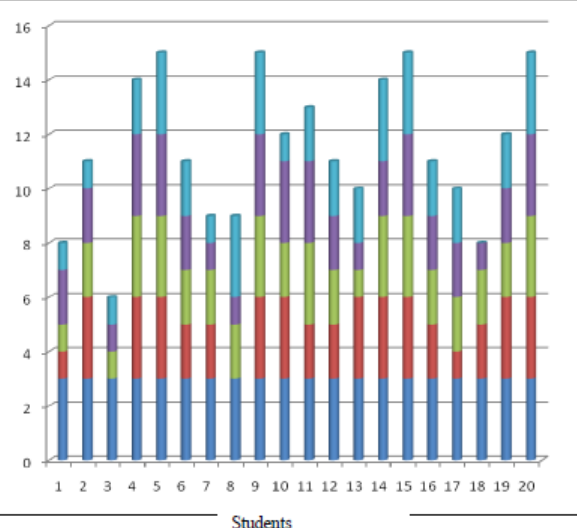
Appendix B
Concept Maps: Scoring Guide/Rubric

|	Excellent	Good	Room for improvement
Criteria	Outstanding 3 points	Average 2 points	Acceptable 1 point
Contents	Listed all major and additional supplementary/ relevant/ related concepts	Listed most of the major relevant concepts	Listed a few major relevant concepts
In-depth information	Mentioned all and some unusual details to enhance the understanding of the topic(s)	Mentioned most of the details to explain the topic(s) in context	Mentioned a few details of the topic(s) in context
Connections/Comparisons	Made all and additional unusual connections with conceptual understandings among the concepts	Made most of the possible connections between/among the concepts	Made few connections between the concepts
Theoretical/holistic views	Made outstanding and far-reaching conceptualization(s) in presenting holistic views	Made notable holistic/ theoretical observations	Began to view the contents in a holistic approach
Creativity/novelty	Used extraordinary/ outstanding creative/novel methods in depicting the ideas	Used good creative/novel methods in depicting the ideas	Used limited creativity/novel methods in depicting the ideas

Appendix C

Graph showing averages of the total scores: Map 1
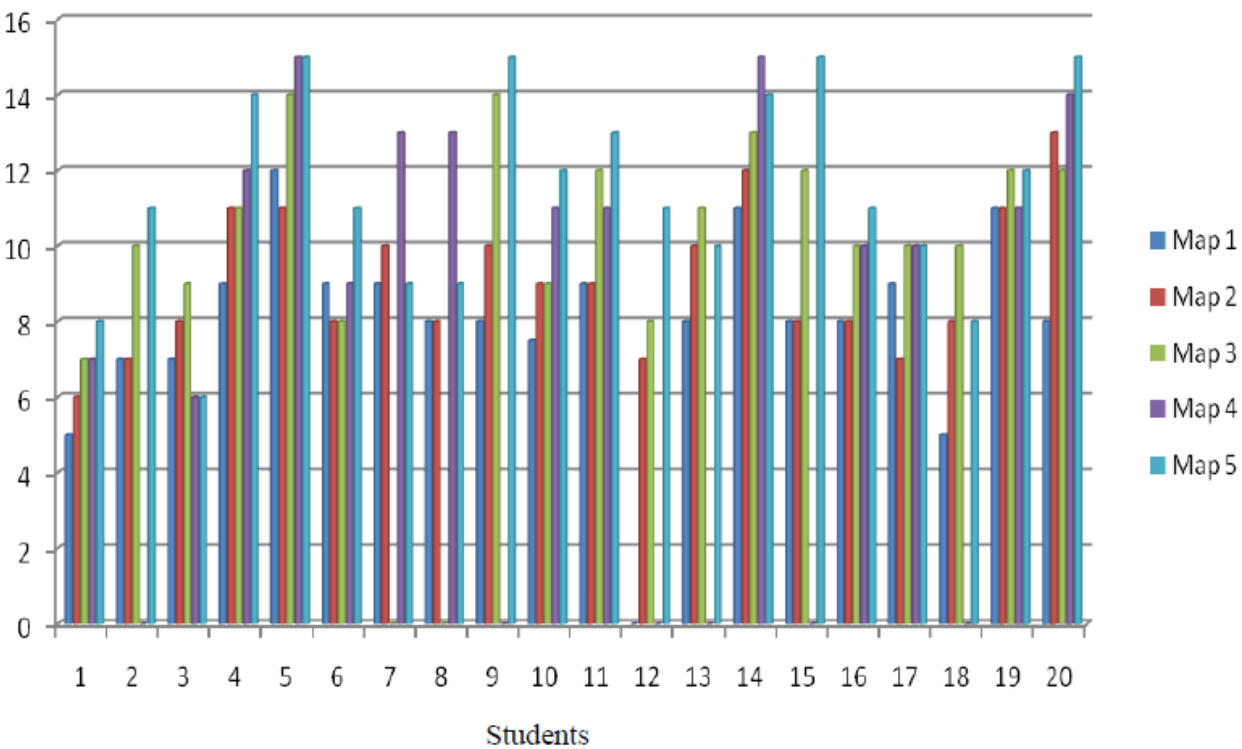
Graph showing averages of the total scores: Map 5

Creativity/novelty
Theoretical/holistic
Connections/comparisons
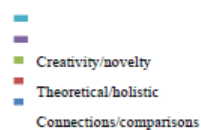
Appendix D

Graph showing total scores by of all students on all maps

Graph showing total scores by of all students on all maps

Appendix E
A sample of a high-scoring Concept Map (reprinted with permission of the student)