Perspectives of Prospective Teachers on Zoom as a Transformative Teaching Methodology

Dr Leela Ramsook & Ms Marlene Thomas

University of Trinidad and Tobago

Corinth Campus

Corinth Road,

San Fernando,

Trinidad.

Tel: 1 868 642 8888

leela.ramsook@utt.edu.tt

marlene.thomas@utt.edu.tt

Abstract

In the Bachelor of Education (BEd) Programme at the University of Trinidad and Tobago, prospective teachers are exposed to 'zoom' classes. This study investigated the perspectives of full-time and part-time prospective teachers with regard to classes conducted via web conferencing, with particular reference to zoom. It examined students' views on the merits and demerits of the use of zoom by instructors. A mixed-method design was utilized as the appropriate design to determine prospective teachers' viewpoints and beliefs, as well as the advantages and disadvantages of classes conducted via zoom. Data were gathered using an online survey, semi-structured interviews with focus groups and reflective posts on Canvas. Data analysis included a combination of quantitative and qualitative approaches. The results indicated that most prospective teachers prefer a combination of zoom and face-to-face classes, while some have a preference for face-to-face classes only. Others desire face-to-face classes together with an integration of different aspects of technology. Some participants lamented about their personal levels of proficiency with web conferencing. The merits and demerits were equitable, based on the maturity of the prospective teachers when the opinions of full-time and part-time students were considered. The conclusions were that zoom classes were satisfying for some prospective teachers whereas others perceived them as convenient and 'a line of least resistance'. The findings have implications for the quality of classes conducted solely via 'zoom' on a consistent basis.

Keywords: prospective teachers, perspectives, zoom, mixed-method

Introduction

Exploration of the task of preparation of teachers remains high on the agenda of educational researchers mainly because those involved in the process are always seeking new ways and means to improve the teaching/learning process. They continuously seek answers to challenges presented in the implementation of teacher education programmes.

Teacher Education continues to undergo transformation in countries all over the world and Trinidad and Tobago is no exception. The University of Trinidad and Tobago (UTT) plays a significant role in the implementation of a BEd programme which is designed to equip candidates with the necessary knowledge, skills and attitudes to become teachers in the education system. This course of study is provided at three campuses in the Centre for Education programmes (CEP), two of which are located in Trinidad and one in Tobago. The programme is offered on both a part time and full time basis in Trinidad and part time in Tobago. This study was conducted with both full time and part time students at both campuses in Trinidad. Menter (2017) underscores the value of teacher research as the conduit through which teachers are able to channel information to other teachers and researchers about their experiences and life in the classroom which seem to become more complex with every generation.

Context

From inception UTT implemented face-to-face teaching methods in the CEP, but there has been a shift in 2018-2019 to "leverage digital technologies" (UTT: Our National University, Moving Forward, p.2) into online learning, more particularly zoom and blended learning. As enunciated in this document, the emphasis of the UTT is on research and development, for the purpose of providing solutions to the challenges in our education system. To achieve this goal, UTT is determined to carry out its responsibility to deliver world-class teaching, learning and pedagogical competencies to students.

With this vision, each programme area within the UTT has been advised to utilize technologies such as web-conferencing and blended learning. Following this directive, the CEP has encouraged faculty to integrate technology in the implementation of their respective courses.

Guided by this directive and in keeping with modern trends, classes are scheduled in face-to-face sessions as well as online learning via Zoom and the Canvas platform. But, such implementation is not without impediments for both students and faculty. One also has to keep in mind that simply changing teaching strategies to improve academic learning could be challenging as there will always be resistance to change (Fullan, 2007), by those who prefer to remain in their comfort zone.

Purpose of the Study

The purpose of the study was to examine the perspectives of prospective teachers regarding instructors' use of zoom as a medium for teaching. It explored their beliefs about the advantages and disadvantages to them. It also investigated their practical knowledge of the meaningfulness of classes conducted via zoom, as opposed to face- to-face classes.

Significance of the Study

This study fills gaps in the research with regard to web conferencing and zoom in particular. It serves to generate feedback data to inform programme improvement at the University of Trinidad and Tobago, as well as illuminate other educational institutions concerned with teacher education. It provides information that can guide national policies, and contributes to the literature locally and internationally.

Research Literature

The Impact of technology

Changing the landscape in any sphere of education suggests changes in environmental and social structures. Gumport and Chun (1999) suggest that the impact of technology on the life of those engaged in academia is so overwhelming that it is necessary to reflect on the dynamic changes in the mode of teaching and learning. It is also important to consider the overall impact of technology on the wider society.

Cloete (2017) reflects on the use of technology in education, particularly the impact of online learning including the strategy of blended learning. She notes that the impact of technology in education is not linear, but as much as it presents various opportunities, it also poses several challenges and "differs from context to context" (p. 1).   A major problem is that infusing technology in education goes way beyond its use as a tool for learning because of its role in reshaping culture and its link to social development. For this reason, continuous reflection is recommended throughout implementation if change is to be meaningful. Personnel must be empowered with the requisite skills. Cloete (2017) notes that, "skills are as important as hardware" (p. 1), while Beetham & Sharpe (2007) affirm a new pedagogy to meet the needs of the digital age.

According to Verene, (2013), "Online education lacks the rhetorical presentation of a face-to-face lecture. Instead, online education reduces students to clients and consumers of information that is available worldwide and decontextualizes content to information that assumes one size fits all" (p. 303). In his argument, Verene (2013) stresses the importance of the presence of the teacher in the classroom and perceives teacher absence as a negative factor in any form of distance education. He is not passionate about online learning, as he believes the whole process of online learning reduces education in its true form to educational management. Contrary to his belief is the view of other researchers, such as Wang (2013), who report on the success of the mastery of skills via video conferencing technology (Alnemary, Wallace, Symon, & Barry 2015). Given the pros and cons of online learning, implementation of its use in teacher preparation may be precarious, but given the global advancements, it is inevitable.

Gleason & Greenhow (2017) in their research with robot-mediated communication (RMC) found that RCM "offers several advantages over traditionally used videoconferencing systems" (p. 173). Barkely, Cross & Major (2014), and Scott (2015), share alternative views on impact online learning. Like Verene (2013), Gleason & Greenhow (2017) emphasize the absence of the real presence of students as a factor that impedes learning. They believe that the mere virtual social presence of students has negative effects on students' engagement in learning and ultimately on their academic achievement.

However, Bransford, Brown, & Cocking (2000) emphasize the potential of technology to help learning, but only when used properly. They discuss video use in the classroom and the importance of interactivity in helping students to learn by being able to re-visit and review the material. With regard to students' preferential mode of learning using technology, De Boer (2013) argues that that many students choose distance mode over face-to-face because of flexibility around work and family commitments.

Prospective Teachers

The prospective teachers who pursue the BEd programme at the UTT are generally considered as the younger generation who are literally growing up in a digital world. They seem to be consumed by the technology provided by the internet. Prensky (2001) refers to today's student population as "digital natives" because they were born in the internet era and seem to have developed a synergistic relationship with the internet.

These postulations concerning students presume that they are intrinsically motivated enough to study on their own and in their own time. There is also the assumption that face-to-face learning and online education are indistinguishable when compared. In a study, Verene (2013) found that, "The guiding principle is that anything that can be accomplished in the traditional classroom can be done electronically" (p. 297). But, he argues that information could be stored via technology, but construction of knowledge and especially a lecture, cannot be replicated online.

Research Questions

1. What are prospective teachers' perspectives with classes conducted via zoom web conferencing?
2. What are the beliefs of prospective teachers on the merits and demerits of the use of zoom as a mechanism for teaching?
3. What are prospective teachers' practical knowledge of classes conducted via zoom?

Participants

Purposive sampling was used to select the participants in the study. They comprised prospective teachers in two full-time and two part-time classes of the Year Two cohort, at the University of Trinidad and Tobago. The sample consisted of ninety-six (96) participants who belong to two different campuses, but data were received from eighty nine (89) individuals. There was a significantly higher number of females than males, as more females are registered for the programme. Their ages also varied significantly as the prospective teachers who attend part-time classes are generally more mature that those attending full-time.

Data Collection Procedures

A mixed method approach was considered appropriate to determine the views, perspectives and practical knowledge of prospective teachers. An amalgamation of quantitative and qualitative data gives a more robust account and more in-depth, richer understanding of the issues addressed in the research (Johnson & Onwuegbuzie, 2004). It affords corroboration and clarification, thus making findings more authentic. An on-line survey, with both open and closed ended questions, was conducted to collect statistical data, which were computed for confirmation of information. Creswell (2015) notes that surveys can be administered to a sample or an entire population of people in order to ascertain and determine the characteristics, opinions, attitudes or behaviours of the population. Details gathered from semi-structured interviews with both individuals and focus groups served to authenticate the particulars (Cohen, Manion, & Morrison, 2007) and maintain the direction of the study. Reflective writings further verified the data, which added to the credibility of the research.

Focus groups interviews were conducted on both campuses with twelve groups, some of which were larger than others, as the sizes of classes varied. The aim was to acquire intimate information on prospective teachers' perspectives, beliefs and practical knowledge in an open and a non-threatening environment. Interviews were audio recorded, with the consent of participants. The information was transcribed verbatim, and transcripts were returned to group leaders who liaised with peers of the respective focus groups to verify the accuracy of data. Meetings were also held with the group leaders for consultation and further verification of data. Prospective teachers participated voluntarily and were assured of anonymity and confidentiality as advised by Miles, Huberman & Saldana (2014). Participants voluntarily posted their reflections online on Canvas or sent them via emails. The different methods of data collection procedures facilitated triangulation as well as established authenticity.

Analysis of Data

Quantitative data were collated and analysed using descriptive statistics to formulate a summation of the information. The qualitative data, which were read reiteratively for depth of meaning, confirmed and substantiated the statistical data with the further elaborations, thereby establishing credibility and deeper understanding. Using Creswell's (2012) process for data analysis, codes and categories were constructed and reconstructed, eliminating redundancies and searching for commonalities, outliers and new insights. Themes emerged and congruent verbatim remarks were identified.

Findings

The data revealed that one hundred percent (100%) of the prospective teachers are au courant with the fact that the University of Trinidad and Tobago is shifting into technological techniques, especially with the use of Zoom as a medium for teaching. But, even though prospective teachers are cognizant of this, seventy-three percent (73%) prefer face-to face instruction while forty-two percent (42%) prefer only zoom classes. However, ninety-two percent (92%) indicated that their preferred mode of instruction is blended learning, which includes both zoom and face-to-face learning. The data, as outlined in the Table 1 below, has implications for the mode of teaching and learning adopted by the university.

Table 1: Prospective Teachers' Perspectives about Zoom

Perspectives	Percentage (100%)
Need for technological competence in the 21st Century	100
Preference for zoom as a medium for teaching and learning	42
Preference for face to face teaching	73
Preference for a blended approach	92

Advantages

All participants (89) found that zoom conferencing is convenient for them while (68) persons found it cheap and accessible. Seventy-eight (78) of them found it flexible and allowed for embarking on a personalized learning journey. Sixty-three (63) persons said that zoom allowed them to function in their homes, a comfortable learning environment. Eighty-two (82) individuals were happy about the availability of recordings, which they were able to view at their convenience. Fifty-seven (57) of the prospective teachers indicated that independent learning was facilitated (Table 2).

Table 2: Advantages of Zoom Identified by Prospective Teachers

Advantages	No of Participants (89)
Convenient	89
Cheap and Accessible	68
Flexible for a personalized learning journey.	78
Comfortable Learning Environment	63
Availability of Recordings	82
Independent Learning Facilitated	57

Excerpts from direct quotes, which demonstrate the advantages of the use of zoom for prospective teachers, are outlined below.

1. *It is convenient and flexible for me . . . can connect with a guest speaker from anywhere in the world to contribute to discussions.*
2. *I greatly appreciate the fact that the work is online and hence it is very convenient.*
3. *As online conferencing sessions can be recorded for future reviews, I can replay the recordings to make notes.*
4. *I can access zoom from anywhere to my comfort. It took the stress off me . . . since I attended class from the comfort of my home.*
5. *I can access the information anytime . . . it is readily available for me online.*
6. *I benefited from a comfortable environment in the safety of my home . . . I was able to concentrate without any distractions and saved on transport.*

Disadvantages

As shown in Table 3 below, sixty- nine (69) participants found that there was limited monitoring of student particularly when classes were large, while forty-one (41) individuals believed that there is a tendency to procrastinate as recordings are always available. This implies that a high level of self-discipline is required. Fifty-four (54) prospective teachers outlined that there is more or less an absence of informal cues such as body language, facial expressions and the affective/humane aspect. This suggests that instructors are unable to effectively gauge participants' understanding. In addition, thirty-six (36) maintained that misunderstandings are not readily clarified since many students are reluctant to ask questions during zoom sessions. Seventy-five (75) individuals lamented that there is a lack of social skills as well as difficulty with

peer and group activity. Sixty-three (63) participants bemoaned that they are constrained by unstable internet connection.

Table 3: Disadvantages of Zoom Identified by Prospective Teachers

Disadvantages	No of Participants (89)
Limited monitoring of students (large classes)	69
Procrastination	41
Absence of informal cues (body language, facial expressions, affective/humane aspect)	54
Misunderstandings are not readily clarified	36
Lack of social skills & difficulty with peer and group activity	75
Unstable internet connection	63

Below are some literal comments, which prospective teachers identified as the disadvantages of the use of zoom.

1. *It was not a very fulfilling experience for me . . . I felt that the online classes really took away from the impact of the lesson . . . relationships became strained.*
2. *I may not be able to get immediate feedback from our lecturer if we do not understand a point and need clarification.*
3. *For me zoom is more teacher-centred. The teacher acts as a sage on the stage, rather than have the students participating.*
4. *Videoconferencing is lacking the aspect of personal interaction with students . . . I do not feel comfortable to ask questions.*
5. *I don't get to work in groups which always give me a little more confidence.   . . . group work is very rewarding.*
6. *Instructors do not have the opportunity to read students' body language and facial expressions of whether they are interested and understanding, what is being taught.*

The verbatim statements authenticate the data in Table 2 and 3. They serve to corroborate the statistical data as well as establish credibility (Creswell, 2012). Also, the integrative method allowed for confirmation of the truthfulness and accuracy of the data. Collaboratively, the data facilitated a clearer understanding and enabled new insights. In addition, the capacity for a more robust analysis of data was amplified.

Themes that Emerged

Four themes that emanated from the data are as follows: *1. Combinatorial Hybrid Approach 2. Proficiency not Product 3. Flexible Learning Pathway 4. Internet Connectivity and Instability.* Participants indicated that there are merits as well as demerits to instruction conducted through zoom. The data revealed that the majority of prospective teachers prefer a combination of zoom and face-to-face classes. Prospective

teachers prefer social interaction, proficiency, meaningful understanding, which can be facilitated better via a hybrid, blended approach. While they appreciate flexibility in learning experiences via zoom, they experienced challenges, particularly unstable internet connectivity. The verbatim remarks which substantiate, support and reflect the themes, are outlined below.

Theme 1: Combinatorial Hybrid Approach

1. *I prefer a combination of online classes and classes conducted via zoom. Having a combination allows the instructor to meet with the students and clear up any misconceptions they may have about assignments and content . . . Classes via zoom can be used to reinforce content and to have extra materials that students need to study . . . Whereas being present in class, they retain more.*

2. *My choice remains that of a blended teaching and learning approach. My reasons for this approach are the teaching landscape is rapidly changing due to the technological rise of the 21st century and traditional face-to-face sessions provides more collaboration, and instant feedback.*

3. *These real-time conversations in class with lecturers help deepen understanding of course content and bridge the gap between experiential learning and real world applications. Zoom is a good platform for learning . . . but when they are blended, learning is more appealing . . . I like both together.*

4. *I must mention that I support a blended approach as I do personally experience the benefits of both traditional face-to-face and online sessions.*

5. *Students are able to work alongside each other in face-to-face classes through group work or other activities, which aid in developing social skills as well as being able to learn from each other. This may be much easier to explain certain things in person but zoom also aids in learning.*

6. *I prefer face-to-face class together with zoom sessions . . . the social interaction concept is diminished or eradicated in the online sessions. The online classes are great since they can be accessed 24/7, and they are necessary.*

Theme 2: Proficiency not Product

1. *I prefer to attend my class, gain meaningful understanding, converse with my peers and the teacher, ask any questions . . . get feedback right away, and be able to work in groups and build my social and communication skill . . . in a student-centred class . . . constructivism . . . no amount of zoom classes can replace a teacher teaching in front of a class.*

2. *The face-to-face preference I have is simply because of the authenticity in delivering a class in person . . . Stemming from my own experiences, students are better prepared for the world in face to face classes, as there is the reality in the classroom with the students, interactions and authority.*

3. *I do prefer face-to-face classes because it is what I am more comfortable with and it is easier to communicate with peers and the lecturer. It is also easier for me to learn and understand . . . face to face learning is more effective and efficient for my learning style.*

4. *Face-to-face classes boost collaboration and creativity through the ability to share ideas more freely. Meeting in person helps you detect body language, feelings, tone, and reactions, which can often be misinterpreted through digital means . . . students can engage in free and open discussions with their peers as well as the teacher for feedback. Teachers can also engage students in physical resources for them to manipulate.*

5. *I enjoy face-to-face classes because I learn better from someone in person. This way consists of more hands-on activities and more strategies, which keep me engaged in the lesson. Physically seeing the lecturer keeps me focused . . . and interaction with my peers deepens my understanding.*

6. *I would rather have classes that are conducted via face to face because I am able to focus more on what is being taught as there are fewer distractions available. It also allows questions or concerns that I may have, to be addressed immediately. Activities can be conducted more effectively and efficiently in a face-to-face classroom setting which promotes social interaction and engagement. This makes the lessons and concepts more meaningful, in my opinion, as I would be more likely to remember what I would have learned.*

Theme 3: Flexible Learning Pathway

1. *These forums facilitate convenience and flexibility as recordings were always accessible and allowed me to plan my day and study time, without having to leave home, as opposed to being obliged to sit in a classroom.*

2. *It was convenient for me whereby I did not have to drive to get to classes. Zoom was easily accessible, once I had internet, I could either use my laptop or my phone to log on.*

3. *Zoom allows me to access the information anywhere and anytime at my convenience. It saves me time and money, as transportation fees are very costly.*

4. *Zoom allows for any inconvenience that may arise. It can be used in the comfort of my home.*

5. *The technologies are very interactive, useful and convenient. It allows for a level of comfort and I can view the lecture in my own time.*

6. *It creates an opportunity for me to access information easily and I can study and learn at my own pace. I believe zoom is convenient and easy to use.*

Theme 4: Internet Connectivity and Instability

1. *I feel frustrated with technical difficulty . . . It does not lock in my attention.*

2. *Sometimes the wifi signal drops and I am unable to access my zoom classes.*

3. *When the internet connection is not good, there is distortion and information is not being heard clearly. It is also distracting . . . also timing is a problem.*

4. *When my internet is not working, I can't access anything and when I have questions about the content, I cannot receive feedback immediately.*

5. *It is an obstacle when the internet is down, as I procrastinate and do not find the time to view recorded sessions.*

6. *I face the problem of having internet disruptions, which cause me serious distress.*

Discussion

The data revealed that zoom allows for teaching to be accessible from different localities, which are comfortable and convenient to prospective teachers. There are also merits and demerits to the use of online conferencing. Most prospective teachers have indicated a preference for blended learning, that is, a hybrid model of face-to face and zoom classes. But the culture of teaching and learning that prospective teachers experienced previously influences why many have a proclivity toward face-to-face classes. Other factors may be attributed to the level of difficulty of the course or the quality of interest in the subject matter. A major contributing factor is the proficiency of the instructor and whether he or she is creative, motivating and inspiring.

One of the most salient requirements for effective zoom sessions is a stable and reliable internet connection. Many participants indicated that they experienced unstable internet connectivity which led to their frustration. This influenced a preference for face-to-face classes. In addition, instructors as well as prospective teachers need technological skills and competencies to navigate the multiple features of zoom efficiently. There were deficiencies as many features such as creating and managing break-out rooms, which could optimize learning, were not used by instructors. Participants complained that they had not received maximum benefits and experiences of the virtual meetings. This impacted on their preference for face-to-face classes.

On another note, prospective teachers who are registered as part-time students, are usually mature persons, some of whom are working parents. They would be predisposed towards zoom or online learning due to time constraints and family commitments. For them, zoom sessions are also cost effective and allow for flexibility as recordings are available at their convenience. However, while recordings may be more suitable for some individuals, there is the drawback of a lack of participation, and the complaint that feedback is untimely.

Self-learning may be a sensitive issue, particularly with the millennials of today, as procrastination is likely to result. A challenge for prospective teachers, therefore, is that of responsibility, self-discipline and self-regulation. With zoom, the onus is on prospective teachers to participate fully, or mute/unmute their videos and audios during conferencing. Therefore, a major concern is self-discipline to sustain engagement throughout sessions. Also, there is also the issue of wise choices and self-reliance because of temptation of other websites such as Facebook, Instagram, as well as other distractions on mobile phones. In addition, while assessments give an indication of academic success, compliance together with engagement time and meaningful contextual learning with zoom seem unpredictable. Furthermore, there are limitations via zoom for the portrayal of social presence and personal dispositions, which may negatively impact self-esteem and self-efficacy as well as the academic performance of prospective teachers.

As web conferencing with zoom is a fairly new phenomenon for teaching and learning at the university, encouraging both prospective teachers and instructors to buy into change may be an issue. Fullan (2007) acknowledges that resistance is always associated with innovation and change. Also, time may be a critical factor in terms of readiness, preparation, planning and organization. Instructors must therefore adopt a reflective approach as well as receive frequent feedback from prospective teachers if transformation is to be facilitated. Unique individualistic concerns also need to be addressed. How to adapt teaching through

zoom to meet the needs of all learners, to differentiate instruction, to engage in hands-on learning are other considerations. A question that arises is whether web conferencing constrains or boosts creative thinking, one of the twenty-first century skills, for both prospective teachers and instructors.

Conclusion

Face-to-face classes combined with zoom sessions are more favourable for prospective teachers. However, the learning environment created through zoom must be facilitated by reliable high speed internet, as well as a high degree of proficiency not only by instructors, but also by prospective teachers.

Recommendations

Zoom has many features, but professional training is required to develop the skills and competencies for both prospective teachers and instructors. Therefore, workshops and tutorials need to be conducted with prospective teachers at inception at the university. In fact, ongoing support is required to develop capacity, which is necessary for effectiveness, efficiency and optimization of learning.

In addition, practical staff development sessions are required for instructors, so that there is skilful use of all features, as the effective use of zoom comes through practice not only for prospective teachers but also for instructors. If instructor knowledge is minimal, there will be limitations to the use of zoom and its operatives. Moreover, when classes are huge, there should be support by technical staff during the sessions. In addition, an evaluation on whether the logistics of zoom can cater for all courses, such as practicals in a laboratory for the hard sciences, is recommended. Using zoom makes online teaching and learning interactive and collaborative for the younger generation who are comfortable with emerging technologies, but proficiency and expertise are required if a hybrid approach is to be sustainable.

Future Research

There is need for future research such as instructors' perspectives on the use of zoom. It will be useful to investigate the preferences of part-time and full-time students as well as make a comparison between the technological competencies of part-time and full-time prospective teachers. In addition, many institutions are shifting into teaching and learning through robot-mediated communication (RBC), hence an examination into its viability may prove interesting.

References

Alnemary, F. M., Wallace, M., Symon, J. B. G., & Barry, L. M. (2015). Using international videoconferencing to provide staff training on functional behavioral assessment. *Behavioral Interventions, 30 (1),* 73–86. doi:10.1002/bin.1403

Barkely, E. F., Cross, K.P. & Major, C. (2014). *Collaborative Learning Techniques: A Handbook for College Faculty. (*2nd ed.). San Francisco, Jossey-Bass.

Beetham, H., & Sharpe, R. (2007). *Rethinking pedagogy for a digital age: designing and delivering e-learning*. New York, NY: Routledge.

Cloete, A. L. (2017). Technology and education: Challenges and opportunities. *HTS Teologiese Studies/ Theological Studies* 73(4), a4589. https://doi.org/ 10.4102/hts.v73i4.4589

Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education*. New York, NY: Routledge.

Gleason, B. & Greenhow, C. (2017). Hybrid learning in higher education: The potential of teaching and learning with robot-mediated communication. *Online Learning Journal,* 21 *(4),* 159-176.

Gumport, P. J. & Chun, M. (1999). Technology and Higher Education: Opportunities and Challenges for the New Era. *American Higher Education in the Twenty-first Century: Social, Political and Economic Challenges.* Baltimore, MD: Johns Hopkins University Press.

Creswell, J. W. (2012). *Educational research: Planning, conducting and evaluating quantitative and qualitative research* (4th ed.). Upper Saddle River, NJ: Pearson.

Fullan, M. (2007). The *new meaning of educational change* (4th ed.). New York: Teachers College Press.

Gleason, B. & Greenhow, C. (2017). Hybrid learning in higher education: The potential of teaching and learning with robot-mediated communication. *Online Learning, 21*(4), 159-176. doi: 10.24059/olj.v21i4.1276

Johnson, R. B. & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher, 33* (7) 14-26.

Menter, I. (2017). Teacher Education Research. In Oxford Encyclopaedia of Education. Oxford University Press. DOI: 10.1093/acrefore/9780190264093.013.275

Miles, M. B., Huberman, M. A. & Saldana, J. (2014). *Qualitative data analysis. A methods sourcebook* (3rd ed.). Beverly Hills, CA: Sage.

Prensky, M. (2001). Digital Natives, Digital Immigrants. On the Horizon (MCB University Press 9 (5) 1-6. Retrieved 26.9.11 from https://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf

Scott, C. L. (2015). *The futures of learning 3: What kind of pedagogies for the 21st century?* UNESCO Education Research and Foresight, Paris. [ERF Working Papers Series, No. 15].

The University of Trinidad and Tobago (2018). *Our National University: Moving Forward*. Retrieved 21.9.19 from: https://utt.edu.tt/press-releases/press-release-20180525

Verene, D. P. (2013), 'Does online education rest on a mistake?' *Academic Quest* 26, 296–307. https://doi.org/10.1007/s12129-013-9367-2

Wang, V. C. X. (2013). Traditional Teaching or Innovative Teaching via Technology? *Learning and Performance Quarterly*, 2(1), 1-13.