ISSN: 2706-0063

Using Flipped Classroom Approach to Enhancing Career and Life Skills: A Study With Mathematics Teachers

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Abstract

Along with technological advancements, there has been a transformative shift in educational practices due to a new paradigm. In this context, there is an increased focus on blended learning models where technology is used to enhance universal design for the learning-teaching paradigm. The flipped classroom approach is a popular blended learning pedagogical practice in mathematics education, providing students with opportunities to enhance 21st century skills to learn at their own pace and from anywhere. In 2017, Steve and Kaurb stated that the flipped classroom has evolved into a more active, participatory environment, contributing to improved creativity and the development of life and career skills in learners, which aligns with the demands of the 21st century, shaped by pedagogy and technological advancements. This study adopted a mixed method design; the data was collected through questionnaires and interviews. The questionnaires were administrated to 244 mathematics teachers in the Galle education division, and face-to-face interviews were conducted with 10 mathematics teachers who were selected randomly from the sample. Data were analysed quantitatively using SPSS (Version 25) software. It is clear that the majority of teachers **(**78.3%) perceived that the flipped classroom approach fosters flexibility and adaptability in students. Additionally, 69.6% of teachers revealed that they are able to respond to students' social interaction needs in the flipped classroom. This means that the majority of teachers in the sample have positive attitudes toward the flipped classroom as a suitable method for the development of social interactions among students. Also 70.5% of the teachers believe that the flipped classroom promotes leadership skills among both teachers and students. However, only 58.6% of the sample agreed that the flipped classroom approach encourages students to take accountability for their learning. Interview results revealed that the teachers expressed positive attitudes toward the potential of the flipped classroom model to develop career and life skills in students. However,

ISSN: 2706-0063

teachers also highlighted barriers to implementing this portal in Sri Lanka, such as insufficient technological resources both at school and home, and the weak internet connections.

***Keywords**: The Flipped Classroom, Mathematics, Career and Life Skills*

1. Introduction and Research Problem

Recently, a paradigm shift in educational practice has taken place as a result of the introduction of a new instructional approach driven by technological advancements. With the revolution of new technology, mathematics teachers are turning their attention to blended learning models which use technologies to enhance learning-teaching paradigm. Among them, the flipped classroom approach is a popular pedagogical practice in mathematics for it provides opportunities for enhancing 21st century skills, while allowing students to learn at their own pace and from anywhere.

According to Strayer (2012), and Xu and Yeli (2018), the flipped classroom approach is relatively a new teaching method that relies on constructivism. It consists of two parts: interactive learning activities conducted during class and individual computer-based learning using technological equipment outside the classroom. It is also described as a model in which students access online videos, lecture notes, pictures, and other materials uploaded by the teacher before the classroom, and subsequently, they use class time for engaging in meaningful activities and discussions (Hughes, 2012; Fauth, 2015). The role of the teacher in a flipped classroom is to support students in constructing knowledge and serve as a facilitator and collaborator of students' learning. Therefore, the flipped classroom approach is a student-centered learning

ISSN: 2706-0063

method which draws heavily from constructivist theories. As a result, the role of teachers in the flipped classroom is transformed into a transaction role.

Bergmann & Sams (2012) defined the flipped classroom (FC) approach as "a blended learning model, which aims to facilitate teachers to make better use of the face-to-face sessions through minimizing teacher lecture and increasing students' active learning, collaboration and scaffolding". In 2019, Umam and Mulyono stated that most teachers have been successful in getting into the flipped classroom approach as a transaction role, to elicit change in their classroom instruction towards career and life skills in mathematics education.

As a preliminary step, the Mathematics Department of the Ministry of Education in Sri Lanka initiated a pilot programme based on the flipped classroom approach in 2018. The pilot study was launched with grade six students and teachers from 20 schools in the Piliyandala Zonal Education Division. Students are asked to prepare for the lesson before coming to the classroom based on activities related to the textbook. Teachers' reflections in this pilot study revealed that the flipped classroom approach was effective in many ways in enhancing students' self-learning as well as career and life skills through intrinsic motivation leading to learning mathematics.

Therefore, the Department of Mathematics of the Ministry has recommended the flipped classroom approach to develop students' career and life skills, which are most important for the learning-teaching process of mathematics in the 21st century. The values of career and life skills are also emphasised in the framework from the partnerships for 21st Century skills framework (P21, 2014). Extensive research has been conducted in the areas of teacher perceptions related to flipped classrooms, and how this approach can be

ISSN: 2706-0063

developed (Bajunury, 2014; Mull, 2012; Kim, Khera, and Getman, 2015). It was also shown by Kutahnecioglu and Balakrishnan (2018) that teachers' perceptions and teacher behaviours impact more on the implementation of the flipped approach and students' achievement in mathematics. However, in Sri Lanka, only a few research studies have been conducted on teacher perceptions of this flipped classroom approach and its implementation. According to the literature review, the Southern province has not yet been undertaken in research related to the topic under study: the flipped classroom approach. Therefore, the Galle Education Zone of Southern province was selected as the research area to fill this research gap.

2. Research Methodology

This study is a descriptive sample survey study based on the mixed method. To achieve the objectives of the study, multiple research tools were used including questionnaire and face-to-face interviews. The use of these tools enabled the researcher to validate the study results and get more reliable findings. A face-to-face interview was conducted with 10 mathematics teachers who were randomly selected, to triangulate the data obtained from the questionnaires. In order to construct the Likert scale questionnaire, the components of life and career skills exposed by the Partnership for 21st Century Learning framework were initially considered. The survey questionnaires were distributed to 244 mathematics teachers with pre-training in the flipped classroom, from secondary schools in the Galle zonal educational division under purposive sampling method according to the researcher's convenience.

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Table 1: Sample of the Teachers

Type of school	Number of teachers		Total
	Male	Female	
1AB	31	97	128
1C	22	48	70
Type 2	31	15	46
Total	84	160	244

The quantitative data collected through the questionnaire were analysed using the Statistical Package for the Social Sciences (SPSS: Version 25). Means, frequencies, standard deviations, t-tests and One-Way Analysis of Variance (ANOVA) were used.

3. Objectives of the Study

This study was undertaken to;

1. examine mathematics teachers' perceptions of fostering career and life skills expected in the 21st century through the flipped classroom approach.
2. identify the obstacles for the mathematics teachers to enhance their experience in flipped classroom approaches.

4. Scope and Significance of the Study

As this study aimed to investigate the perceptions of mathematics teachers on flipped classroom approach towards the career and life skills, it has been revealed that mathematics teachers' attitudes and perceptions are critically

ISSN: 2706-0063

important for empowering the implementation of the innovative teaching approach in mathematics education. Therefore, mathematics teachers represent one major beneficiary of this study. In addition, the Ministry of Education and Higher Education can benefit from the results to plan for training courses and workshops to publicise the effectiveness of flipped classroom approach. These results can also contribute to the design of training courses and workshops to disseminate the effectiveness of the flipped classroom.

5. Review of the Relevant Literature

According to Xu and Yeli (2018), flipped classroom approach is relatively a modern teaching method that relies on constructivism. It consists of two parts: interactive learning activities conducted during class, and individual computer-based learning using technological equipment outside the classroom. It is also described as a model in which students first access online videos, lecture notes, pictures, and other materials uploaded by the teacher before the classroom and then they engage in meaningful activities and discussions during class time. The role of a flipped classroom teacher is to support students with the construction of knowledge and foster a student-centered learning method drawing heavily from constructivism theories. As a result, the role of teachers in the flipped classroom is transformed into a transaction role. In light of this situation, and the influence of social needs in the 21st century, there should be a transformation of the current mathematics teacher and the textbook-centred learning environment in order to promote the development of students' skills.

ISSN: 2706-0063

According to Warner and Kaurb (2017), the flipped classroom environment has been transformed into a more active, participatory environment, improving learners' creativity and career and life skills. This transformation is in line with 21st-century skills influenced by pedagogy and technologies. Furthermore, he affirms the value of developing 21st century skills through student-centred learning that emphasises 2T2C model. Also, he stated that real-world mathematics enhances the quality of learning by developing student participation, self-learning experiences outside the classroom based on technology, and encouraging problem-based learning to develop career and life skills. In 2018, Park revealed that learners improved their responsibility, problem-solving ability, creative thinking, cooperative ability, and career and life skills through the flipped learning approach.

Furthermore, Umam and Mulyono (2019) conducted an in-depth study on the implementation of the flipped classroom involving mathematics teachers, and they stated that teachers perceived this as an approach that could improve life and career skills, and a deeper understanding of new concepts and products in mathematics. Since the development of skills in students is essential to the economy of the society, it is contextually important to examine the teacher's perceptions of acquiring those skills through a flipped approach.

6. Results and Findings

It was revealed that the majority (78.3%) of teachers were in the view that flipped classrooms improved students' flexibility with engaging activities. It is clear that the majority of teachers perceive that the flipped classroom approach creates flexibility and adaptability skills in students. Furthermore, 66% of the teachers agreed that students can reflect critically on past

ISSN: 2706-0063

experiences in order to inform self-direction in flipped classrooms. In addition, 69.6% of them revealed that flipped classroom enables teachers to act in response to students' social interaction needs. This means that the majority of teachers in the sample have positive attitudes towards creating social interaction in students through the flipped classroom. Additionally, 75% of the sample indicated that flipped classroom reverses the role of the student from a passive observer to an active participant.

Furthermore, the majority of teachers (88.6%) stated that the flipped classroom helps students to deliver effective learning outcomes (Productivity) and 80% of the teachers reported that the flipped classroom strengthens students' preparation before coming to class. 87.65% of teachers agreed that the flipped classroom develops responsibility skills for each student by encouraging students to complete the pre-preparation activities before coming to the classroom. Also, 70.5% of the teachers are in view that flipped classrooms promote leadership skills in both the eachers and students. But only 58.6% of the sample agreed that the flipped classroom approach promotes students' accountability for their learning. The interview results revealed that the majority of teachers believe that the flipped classroom approach leads students to self-learning before coming to class. As a result, students are more likely to develop responsibility, inquiry-based learning, collaboration with peers and leadership skills. It has been revealed that there is a significant difference between the mean of perceptions of male and female mathematics teachers towards the life and career skills at $\alpha \leq 0.05$, ($t_{242} = 0.000$ $p < 0.05$). When examining the reasons for this attitudinal difference between males and females, the interview results revealed that the inability of female teachers to use technology in the learning and teaching process was affected by it.

ISSN: 2706-0063

Furthermore, the ANOVA test results are at F=3.973, p=.009 $<$.05. It was revealed that the type of school where the teachers are currently working has influenced teachers' perceptions.

However, the interview results revealed that most teachers have a positive attitude towards the fact that life and career skills can be developed in students through the flipped classroom model. However, teachers also highlighted barriers to bringing this portal to a practical level such as the insufficient technological resources at school and home, and the weak internet connection.

7. Conclusions

The study results demonstrated that the sample was well aware of the importance of the flipped classroom approach towards enhancing career and life skills. By changing the perceptions of the mathematics teachers, the concern about the lack of technology can be reoriented and simple learning management systems, worksheets, or a study guide can be introduced as alternative suggestions. Therefore, appropriate strategies should be developed to improve teacher training in the flipped classroom and action plans should be developed to implement context-based solutions that teachers themselves can design and implement to change the self-responsible attitudes in students about mathematics learning.

8. References

Kutahnecioglum, N., & Balakrishnan, K. (2018). *Flipping perceptions, engagements, and realities: A Case study*. Turkish Online Journal of Distance Education-TOJDE, 20(1), Article 13. Retrieved from ORCID: https://orcid.org/0000-0002-3778-3585.

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Partnership for 21st century skills [PCS]. (2009). *Framework definitions.* Retrieved from www.p21.org/documents/P21_Framework_Definitions.pdf.

Park, J. (2018). Application of professor learning model customized for flipped learning for enhancing basic ability of work-focused on freshman students in radiology department of specialized colleges. *J. Korean Soc. Radiol.* 12, 225–231. doi: 10.7742/jksr.2018.12.2.225

Sletten, S. R. (2017). Investigating Flipped Learning: Student Self-Regulated Learning, Perceptions, and Achievement in an Introductory Biology Course. *Journal of Science Education and Technology,* v26 n3 p347-358.

Umam, K., & Mulyono, H. (2019). An Application of Flipped Classroom in

Mathematics Teacher Education Programme. *International Journal of Interactive Mobile Technologies, (JIM)*13(3): 68-80. Retrieved from https://doi.org/ 10.3991/ijim.v13i03. 10207.

Warner, S., & Kaurb, A. (2017). The perceptions of teachers and students on

a 21st century Mathematics instructional model. *International electronic journal of mathematics education,* ISSN: 1306-3030. 2017,Vol. 12,NO.2,193-215. Retrieved from https://www.google. com/search? client=firefox-b.

Xu, & Yeli. (2018). Application of Constructivist Theory in Flipped Classroom — Take College English Teaching as a Case Study. *Theory and Practice in Language Studies*, *8*(7), 880. Retrieved from https://doi.org/10.17507/tpls.0807.21