




Perceptions On Flipped Classroom Approach Towards Digital Literacy Skills: A Study with Mathematics Teachers

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ABSTRACT

The flipped classroom approach is a blended learning model concerning developing digital literacy skills in the 21st century. Hence this study was launched to find out the mathematic teachers' perceptions of flipped classrooms towards digital literacy skills and to identify the opportunities available for the mathematics teachers to enhance their experience in flipped classroom approaches. The mixed method research design was used and the Likert scale questionnaire was administered to randomly selected 244 mathematics teachers, from the school in Galle education division, Sri Lanka. Face-to-face interviews were conducted with randomly selected 10 mathematics teachers from the sample to data triangulation, Data were analyzed quantitatively using SPSS (Version 25) software. The result showed that the majority of the (71.3%) sample was in the view that the flipped classroom approach can promote teachers to become organizers of information literacy. Furthermore, most teachers (78.7%) agreed that the flipped classroom approach can communicate students' ideas with each other by utilizing multiple media and technologies. In addition, 80.7% of the sample point out that the flipped classroom approach promotes both teachers' and students' computer literacy skills. The findings also revealed statistically significant differences at ($\alpha \leq 0.05$) on the total degree of perceptions towards digital literacy skills due to gender since (0.00) is less than (0.05). It was revealed teachers' perceptions were, that digital skills could be developed through this approach, but lack of adequate technological resources at school and home, poor internet connectivity in rural areas and students still depending on the teacher to learn mathematics were identified factors that obstacles to enhancing this approach to a practical level in Sri Lanka.

Keywords: Flipped classroom approach, Digital Literacy, Mathematics



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Introduction

The 21st-century technological revolution has significantly impacted the global education system. The widespread adoption of the internet, personal computers, smartphones, and social media are instances of this unparalleled change. These technological advancements raise educational standards and develop novel approaches to teaching and learning processes. This indicates that technology is now deeply ingrained in the present educational system, either through the use of smart boards, smartphones, or even social media. Recognizing the necessity to incorporate Information and Communication Technology into classrooms to effectively engage Z-generation students toward digital skills is vital in recent times. In brief, digital literacy is the ability to interpret and apply information in a variety of formats from a variety of sources when delivered via computer ethically and responsibly. Traditional teaching methods are inappropriate for effectively imparting these digital literacy skills to learners. (Kaur, 2016, P. 21).

In the era of new technology, mathematics teachers are increasingly focusing their attention on blended learning models that leverage technology to enhance classroom learning. As a teaching paradigm, the flipped classroom approach is a popular pedagogical practice in mathematics, providing opportunities for enhancing 21st-century skills to learn anywhere and at their own pace.

The flipped classroom approach, defined as a blended learning model, aims to enhance teachers' utilization of face-to-face sessions by minimizing lecturing and promoting students' active learning, skills development, and scaffolding (Bergmann and Sams, 2012, P.97). The learners' digital literacy practices are also recognized as crucial for success in blended learning environments (Tang and Chaw, 2016, P.8). Moreover, scholars emphasize the significance of teachers' perception and awareness for the success of the flipped classroom in secondary schools. and they found that the flipped classroom approach has bolstered students' digital literacy skills. (Yang, 2017, P. 23) ; (Smith and Johnson, 2017, P.65).

Currently, this approach is used in many higher education institutions in Sri Lanka. Many scholars have also shown that it can be successfully used in secondary education in mathematics (Amarasinghe, 2021, P. 54). In 2018 as a preliminary step, the Mathematics Department of the Ministry of Education, Sri Lanka launched a pilot program based on the flipped classroom approach as an innovative method in mathematics. 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 digital literacy skills through intrinsic motivation leading to learning mathematics.

Therefore, the main purpose of the research is to determine what are the perceptions of Sri Lankan mathematics teachers on the flipped classroom approach towards digital literacy skills in students for the 21st century.

Specific objectives

This study was undertaken to:

1. Find out the mathematic teacher's perceptions of the flipped classroom approach toward digital literacy skills in students.
2. Identify the barriers for mathematics teachers to enhance the experience in the flipped classroom approach.

Scope and Significance of the Study

This study aimed to investigate the perceptions of mathematics teachers on the Flipped classroom approach toward digital literacy skills. It has been revealed that teachers' attitudes and perceptions are critically important for empowering to 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 publicize the effectiveness of the flipped classroom approach. These results can also contribute to the design of training courses and workshops to disseminate the effectiveness of the flipped classroom.

Review of the relevant literature

The flipped classroom approach is almost a modern teaching method that depends on constructivism (Xu and Yeli, 2018, P. 67). It consists of two parts interactive learning activities during lessons and individual learning based on the embedded computer, technological equipment, and other documents beyond the classroom. It is also described as a model in which students access the online video, lecturer notes, pictures, and other materials uploaded by the teacher before the classroom and secondly, they get class time to practice in meaningful activities and discussions. The role of a flipped classroom teacher is the support students' construction of knowledge and student-centred learning method with a mechanism drawn entirely 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 textbook-centered learning environment into a potential for developing students' skills.

The flipped classroom environment has been transformed into a more active, participatory environment and improving learners' creativity and digital literacy skills, which concern 21st-century skills as influenced by pedagogy and technologies (Warner and Kaurb, 2017, P.26). Furthermore, he affirms the value of developing 21st-century skills through student-centered learning that emphasizes the 2T2C model. Also, he stated that real-world mathematics enhances the quality of learning by developing student participation, self-learning experiences outside of the classroom with technology, and encouraging problem-based learning to develop digital literacy skills.

A comprehensive study involving mathematics teachers explored the use of the flipped classroom model, finding that teachers believed it could enhance students' digital literacy skills and foster a deeper comprehension of mathematical concepts and applications (Umam & Muliono, 2019, p. 12). Since the development of skills in students is essential to the digital society, it is contextually important to examine the teacher's perceptions of acquiring those skills through a flipped approach because digital literacy skills combine the ability to use technology, critical thinking, and collaboration skills in a flipped classroom (Weippert et al., 2017, P.33).

Research Methodology

The mixed method research design was used and data were collected through the questionnaire and interviews. The Likert scale questionnaire with a reliability coefficient of 0.911 was administered to randomly selected 244 mathematics teachers with pre-training in the flipped classroom approach, from the 141 schools based on type of school in Galle education division, Sri Lanka. Face-to-face interviews were conducted with randomly selected 10 mathematics teachers from the sample to enhance data triangulation, which contributes to the reliability and credibility of the findings. Quantitative data were analyzed using SPSS (Version 25) software.

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

Results and Discussion

The result showed that the majority of the teacher's sample was in the view that the FC approach can monitor student creativity when learning mathematics. Also, 78.3% of the sample agreed that the flipped classroom approach enables students to build knowledge outside the classroom and 82.1% of teachers agreed that students can communicate their ideas with each other using multiple media and technologies. The result showed that the majority of the sample was in the view that the FC approach can promote teachers to become organizers of information literacy. Furthermore, 80.7% of the sample revealed that the flipped classroom approach promotes both teacher and student computer literacy skills. The results of interviews with teachers revealed that computer literacy skills are essential for developing students' vocational technical skills. In addition, 86.4% of

teachers in the sample revealed that using the flipped classroom approach to improve access to information through technology provides a digital solution to the problem of time in classrooms in Sri Lanka. The statistical ANOVA-test results indicated that there were statistically significant differences between the currently working school type of mathematics teachers and the perceptions of mathematics teachers towards digital literacy skills enhanced by the flipped classroom approach as illustrated in Table 1, $F=3.409, p=.010 < .05$.

Table 2: ANOVA- Test of Mathematics Teachers' perceptions towards digital literacy skills through FC approach based on school type

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.148	2	.074	3.409	.010
Within Groups	40.213	241	.167		
Total	40.361	243			

The quantitative data collected through the questionnaire were analyzed using the Statistical Package for the Social Sciences (SPSS: Version 25). Means, frequencies, standard deviations, t-tests for independent samples, and One-Way Analysis of Variance (ANOVA) were used to find out descriptive statistical analysis.

Furthermore, the result of T- the test presented in Table 3 shows that the Sig (2-tailed) value is 0.00 which is less than 0.05. This implies that there is a significant difference in teachers' perceptions due to gender in imparting digital literacy skills through FC.

Table 3: T-test for independent samples of mathematics teachers' perceptions towards the digital literacy skills by flipped approach due to gender

<i>Teachers' perceptions Towards Flipped Classroom (FC)</i>	Gender	N	Mean	S. D	T	Sig.*
Total	Male	84	2.3876	.42894	4.310	.000
	Female	160	2.1590	.37377		

*The mean difference is significant at the 0.05 level.

Comparing the means and standard deviations of teachers' perceptions about gender shows apparent differences between the males and the females in their perceptions of flipped classrooms but these are slight differences.

The results of the interviews with teachers revealed that inadequate teacher training and refresher courses on technical skills and disability to manipulate technological equipment,

weak internet connection, lack of knowledge of social platforms, and insufficient technological tools at school and home discouraged implementing the flipped classroom in Sri Lankan schools.

Conclusions and Recommendations

The study results demonstrated that the mathematics teachers of the sample were well aware of the importance of the FC approach toward digital literacy skills. There were statistically significant differences at ($\alpha \leq 0.05$) on the total degree of perceptions between mathematics teachers' perceptions of the FC approach towards digital literacy skills due to gender and current working school type of teachers. On the other hand, weak internet connection, limited resources, non-cooperative administrative applications, inadequate teacher training, and refresher courses were barriers to implementing the flipped classroom approach. Therefore, practice-oriented strategies should be used to improve mathematics teacher implementation in Sri Lanka.

References

- Akçayır, G. & Akçayır, M. (2018). "The flipped classroom: A review of its advantages and challenges", *Computers & Education*, vol. 125, pp.334-345
- Amarasinghe, A. (2021). *Investigation of the effectiveness of applying the Flipped classroom method in Mathematics*. Proceedings of the International Conference on Mathematics and Mathematics Education: University of Peradeniya 8th and 9th October 2021. ISBN 978-624-5709-03-8.
- Bergmann, J., & Sams, A. (2012). *Flip Your Classroom: Reach Every Student in Every Class Every Day* (pp. 120-190). Washington DC: International Society for Technology in Education.
- Kaur, M. P. (2016). Teachers Education in India: Inclusion of ICT in teachers' education. *International Education and Research Journal*, 2(2). Retrieved from https://www.academia.edu/36820290/Role_of_Digital_Technology_in_Teaching-Learning_Process
- Partnership for 21st-century skills [PCS]. (2009). *Framework definitions*. Designed in cooperation with the National Science Teachers Association 21st century skill map. Retrieved from http://www.p21.org/storage/documents/21stskillmap_scienc
- Rita, N and Hermann, T.(2021). Digital technology in learning mathematical literacy, can it be helpful? : Conf. Ser. 1776. *Journal of Physics: Conference Series* . doi:10.1088/1742-6596/1776/1/012027.
- Suharno A., Agung Pambudi N., Harjanto B. (2020). Vocational education in Indonesia: history, development, opportunities, and challenges. *Child Youth Serv. Rev.* 115, 105092–105015. doi: 10.1016/j.chilyouth.2020.105092
- Tang, C.M. and Chaw, L. (2016) Digital Literacy: A Prerequisite for Effective Learning in a Blended Learning Environment? *Electronic Journal of e-Learning*, v14 n1.
- Weippert, Achim and Kajewski, (2017). "Internet-based Information and Communication Systems - A Case Study Analysis," *J. Basic Educ.*, vol. 2, no. 2, DOI: 10.1016/S0261-5177(02)00005-5.
- Xu and Yeli (2018), (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. <https://doi.org/10.17507/tpls.0807.21>

Yang, C. C. R. (2017). An investigation of the use of the 'flipped classroom' pedagogy in secondary English language classrooms. *Journal of Information Technology Education: Innovations in Practice*, 16, 1-20.

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