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Flipped classroom: A review of recent literature

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Abstract

The use of learning technologies, especially multimedia provide varied facilities for students' learning that are not possible with other media. Pedagogical literature has proved that individuals have different learning styles. Flipped classroom is a pedagogical approach which means that activities that have traditionally taken place inside the classroom take place outside the classroom and vice versa. The flipped classroom environment ensures that students become more active participants compared with in the traditional classroom. The purpose of this paper is to fulfil the needs regarding the review of recent literature on the use of the flipped classroom approach in education. The contribution of the flipped classroom to education is discussed in relation to the changes in students' and instructors' role. Subsequently, flipped classroom applications in various disciplines of education are illustrated. The recommendations made in the literature for design specifications that integrate flipped classrooms with technology are discussed. The paper concludes that a careful consideration of the warnings and recommendations made in the literature can help to produce effective flipped classroom environments and also this paper attempts to inform those who are thinking of using new technologies and approaches to deliver courses.

Keywords: flipped classroom, inverted classroom, blended learning, active learning.

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1. Introduction

The interest in internet based technologies within the field of education has increased. Electronic learning environments and online courses are generated where intranets, websites and computer-mediated communication are used by educational institutions (Williams, 2002). Blended learning is a learning approach that combines a number of learning tools such as electronic performance support systems, web-based courses and real-time collaboration software with face-to-face classroom (Singh, 2003). The flipped classroom is a learning design that may sometimes play an important role in blended learning (Baepler, Walker & Driessen, 2014).

According to Bergmann Overmyer & Wilie (2015), the traditional definition of a flipped classroom is replacing direct instruction with videos and encouraging students to focus on important learning activities with their teachers inside the classroom. It is argued that there is misinformation about the flipped classroom and this misinformation can be clarified by defining the flipped classroom as personalised education where students take responsibility of their own learning. In addition, the flipped classroom allows the teacher to be a facilitator and also increase interaction and personalized contact time between teachers and students. The flipped classroom is also explained as creating problem-based learning inside the class and replacing direct instruction with videos in order to provide instructional content to be accessed whenever and wherever it is required by students (Bergmann & Sams, 2012; Hamdan, McKnight, McKnight, & Arfstrom, 2013). Hamdan et al. (2013) stated that instruction can be delivered by recording and narrating screencasts of work on computers, creating videos of teachers while teaching or gathering video lessons from trusted internet sites.

This paper aims to provide a review of recent literature on the use of the flipped classroom model in education. Firstly, the contributions of the flipped classroom to education will be discussed by indicating the advantages of this model for both learners and instructors. Next, flipped classroom studies and its implementation in various disciplines will be explained. This will be followed by a section which covers future research requirements by stating the information gap in the literature. In conclusion, this paper argues for the role of the flipped classroom in education and provides recommendations for the adaptation of the flipped classroom approach to teaching and learning activities.

2. Contributions of the Flipped Classroom to the Educational Environment

According to Borg and Shapiro (1996) people's learning styles differ from each other and personality type has a significant role on deciding how a person learns best. The incompatibility of an instructor's teaching style and a learner's learning style may cause less learning and also a reduction of interest in the subject matter. Lage, Platt & Treglia (2000) stated that with the use of new learning technologies it is possible to move lectures which traditionally take place inside the classroom to outside the classroom and learning activities which occur outside the classroom to inside the classroom with the guidance of the instructor. Flipped teaching is a pedagogical approach to blended learning where classroom activities and homework are interchanged (Tucker, 2012). A literature survey shows that there are synonymous terms with flipped teaching which have been used in different studies (Hung, 2015). The term 'inverted classroom' is used by Lage and Platt (2000), 'just-in-time teaching' is used by Novak (2011), 'flipped classroom' is used by Bergmann and Sams (2012) and 'inverted learning' is used by Barker, Quennerstedt & Annerstedt (2013) in order to explain the same approach.

Planning and responsibility are two requirements of a successful flipped classroom. Content spread can be prevented and student implementation regarding learned activities can be supported by the use of a flipped classroom model. In addition, all levels of Bloom's Taxonomy can be accomplished. The outside classroom content fits in the lower levels of Bloom's Taxonomy, such as understanding and remembering, and inside classroom content fits in the higher order levels, such as creating, evaluating, analyzing and applying (See & Conry, 2014).

The design principles for the flipped classroom are recommended by Kim, Kim, Khera & Getman (2014) are as follows:

- Providing an opportunity for students to gain preliminary information before the class activity,
- Encouraging students to watch online lectures and be prepared before the class activity,
- Organizing methods of assessment,
- Linking in-class activities with out-of-class activities,
- Supplying clearly stated and well organized guidance,
- Providing sufficient time for the completion of assignments,
- Promoting students to build a learning community,
- Providing immediate feedback on individual or group works,
- Providing the use of familiar technologies which can be accessed easily by students.

Enfield (2013) explained that students are encouraged to move out of the classroom to learn anytime and anywhere by flipped classroom approach. The most useful study strategy can be chosen and used by students while moving at their own pace through the instruction. Hung (2015) demonstrated that students' participation, satisfaction and performance showed a positive change after taking part in this pedagogical approach.

McLaughlin and Rhoney (2015) expressed that the awareness of instructors who used the flipped classroom approach has increased concerning teaching strategies. In addition, Kong (2014) stated that teachers improve the sort of resources they have, experience reflective discussions and share their instructional practices by using the flipped classroom model.

3. The Flipped Classroom in Various Disciplines of Education

See and Conry (2014) provided a unique model of flipped classroom for a faculty of clinical pharmacy. The faculty instructors were required to watch a YouTube origami video on "How to make a paper crane?" and a Prezi presentation, to build their own crane and send a picture of their crane to the facilitators by the deadline. In-class activities covered a quiz on the homework, evaluation and feedback of the cranes prepared by faculty instructors and reflections on individual, small and large groups. This study succeeded in sensitizing the faculty concerning the flipped classroom approach. In addition to this the said faculty development program can be a model for other educational institutions to modify teaching techniques when teaching pharmacy students.

Gilboy, Heinerichs & Pazzaglia (2015) implemented the flipped classroom model in two undergraduate nutrition courses and explained perceptions of students regarding the model. The template used in the study allows the faculty to design activities which can be implemented before, during and after the class, and also assessments incorporating Bloom's Taxonomy. It is found that the majority of the 142 students preferred the flipped method compared with the traditional classroom.

McLaughlin and Rhoney (2015) examined flipped neurologic pharmacotherapy course students' performance, engagement and perception regarding the interactive online tool and compared outcomes between the tool and the traditional downloadable paper handout. It was found that students who were using the online tool got considerably higher marks on the final exam.

Roach (2014) implemented a partially-flipped class during one semester of a microeconomics course and analyzed students' perception toward flipped learning. At the end of the course it was found that students had a positive impression of the flipped classroom.

Simpson and Richards (2015) used a flipped classroom approach to re-design a population health course of a nursing program. As a result, student reflections showed that students had a better understanding of the content in a nursing curriculum.

Baepler et al. (2014) applied the flipped classroom model to a chemistry class and investigated the effect of decreasing the seating time inside a conventional amphitheatre lecture hall. The findings of the study showed that learning outcomes were achieved by students at least as good as in the traditional classroom.

Butt (2014) studied a flipped classroom approach by inverting classroom materials with after-class materials of a final year actuarial course. Student views were obtained at the start and end of the semester regarding the flipped classroom structure. At the end of the study, it was found that there was a significantly positive change in student views towards the flipped classroom approach.

Hung (2015) examined the possible impacts of flipping the classroom on English language learners' academic performance, learning attitudes and participation levels. Three different formats of flipped teaching were applied and it was found that the structured and semi-structured flipped lessons became more effective than the non-flipped lessons.

Love, Hodge, Grandgenett & Swift (2014) applied a flipped classroom model for one section of an applied linear algebra course and a traditional lecture format for another section of the course. End of semester surveys and exams were prepared for the review of students' content understanding and course perceptions. Sequential exams showed that students in the flipped classroom had shown more increase than students in the traditional lecture section. In addition, the results of the end of semester survey showed that flipped classroom students were quite positive regarding the course.

4. The Research Needs Regarding the Flipped Classroom

Williams (2002) provided a literature review study on the use of internet-based technologies in higher education, concentrating on the key issues and existing problems when transferring courses to an electronic learning environment. The study indicated the requirements of future research concerning teaching and learning on electronic learning environments. According to Williams (2002) further research must represent the most effective forms of student support and guidance in electronic environments, the most appropriate pedagogic theories for the cultural change involved in online learning, learning approaches which are adopted by students for learning online and the suitability of different subjects for an electronic learning environment.

Hamdan et al. (2013) demonstrated that one way of creating a learner-centred classroom environment is the use of flipped learning model. It is also illustrated that there are qualitative and quantitative research needs for pointing out how the potential of the model can be maximized.

Kim et al. (2014) suggested further investigation to define design specifications that integrate flipped classrooms with technology and also suggested intensive research regarding the use of technology and superior assessment instruments.

Travis (2014) claims that further research is necessary regarding the acceptance of flipped learning as a common pedagogical practice. Although the study of Travis (2014) has shown students' responses regarding one semester in a particular field, more research must be conducted to test the efficacy of flipped learning, such as quantifying the learning of students from flipped learning.

Butt (2014) investigated how students' perceptions of the use of class time change after being involved in a flipped classroom structure. Although the results of the study consider student perceptions of learning experience, it makes no comment on the success of the students in obtaining desired learning outcomes of the course. Further research is suggested to study the effect of a flipped learning environment on obtaining learning outcomes.

Baepler et al. (2014) decreased face-to-face instruction from 150 minutes to 50 minutes a week and found that learning outcomes did not worsen. As a further study, it is recommended that the optimal amount of face-to-face instruction that provides the greatest learning benefit for students be investigated.

Simpson and Richards (2015) demonstrated that the effectiveness of flipped learning course designs might be helpful for other faculties in designing courses more effectively regarding learners' needs. Deficiency in investigations concerning flipped classrooms were also emphasized: such as different teaching methods and designs must be used to make effective comparisons among student outcomes for courses. In addition, it is also suggested to determine whether such course designs enhance the level of student comprehension by evaluation of the level of content retention and the ability of students to apply the content.

5. Conclusion

Although it is difficult to meet every particular learning style of students in the traditional classroom, the flipped classroom pedagogical approach provides teaching that addresses students with various styles of learning. New teaching technologies supply in-class learning activities to take place outside of the classroom and out-of-class activities to take place in the classroom being led by the instructor. The flipped classroom allows the replacement of direct instruction with videos that can be accessed anytime and anywhere by learners and also by creating a problem-based learning environment during face-to-face teaching time (Bergmann & Sams, 2012; Hamdan et al., 2013).

The review of the literature indicates that there is an increased contribution to the educational environment by the use of flipped classroom. Firstly, student applications [INQUIRIES?] concerning learned topics can be provided and also all levels of Bloom's Taxonomy can be accomplished by the use of the flipped classroom model. Students are encouraged to move out of the classroom to learn independently of place and time and also to choose the most useful study strategy for their own learning. Moreover, it is found that instructors who used the flipped classroom model improved the sort of resources they have, experienced reflective discussions and shared their instructional practices among each other.

It was found that the flipped classroom model has been applied in various disciplines of education with the aim of increasing interaction and personalized contact time between students and instructors in the classroom. In-class activities and out-of-class activities have been interchanged for a limited period of different courses, such as clinical pharmacy practice, nutrition, neurologic pharmacotherapy, microeconomics, population health, chemistry, actuarial science, English language and linear algebra. The majority of studies show that there was a significant positive change in student views towards the flipped classroom approach.

The results of the literature survey in this study demonstrate that there is an information gap as regards the flipped classroom approach. Further investigation is suggested to define design specifications of flipped classrooms and to intensively research the use of technology and superior assessment instruments. Furthermore, it is recommended to conduct research on the effect of a flipped learning environment on obtaining learning outcomes and an optimal amount of face-to-face instruction that provides the greatest learning benefit for students from flipped teaching.

References

- Baepler, P., Walker, J., & Driessen, M. (2014). It's not about seat time: Blending, flipping, and efficiency in active learning classrooms. *Computers & Education*, 78, 227-236.
- Barker, D., Quennerstedt, M., & Annerstedt, C. (2013). Inter-student interactions and student learning in health and physical education: A post-Vygotskian analysis. *Physical Education and Sport Pedagogy*, (ahead-of-

print), 1-18.

- Bergmann, J., & Sams, A. (2012). Before You Flip, Consider This. *Phi Delta Kappan*, 94(2), 25-25.
- Bergmann, J., Overmyer, J., & Wilie, B. (2015). *The Flipped Class: Myths vs. Reality - THE DAILY RIFF - Be Smarter. About Education. Thedailyriff.com*. Retrieved 5 January 2015, from: <http://www.thedailyriff.com/articles/the-flipped-class-conversation-689.php>
- Borg, M., & Shapiro, S. (1996). Personality Type and Student Performance in Principles of Economics. *The Journal of Economic Education*, 27(1), 3-25.
- Butt, A. (2014). Student Views on The Use of A Flipped Classroom Approach: Evidence From Australia. *Business Education & Accreditation*, 6(1), 33-43.
- Enfield, J. (2013). Looking at the Impact of the Flipped Classroom Model of Instruction on Undergraduate Multimedia Students at CSUN. *Techtrends*, 57(6), 14-27.
- Gilboy, M., Heinerichs, S., & Pazzaglia, G. (2015). Enhancing Student Engagement Using the Flipped Classroom. *Journal of Nutrition Education And Behavior*, 47(1), 109-114.
- Hamdan, N., McKnight, P., McKnight, K., & Arfstrom, K. (2013). Research, Reports & Studies / Lit Review. Flippedlearning.org. Retrieved 5 January 2015, from: <http://www.flippedlearning.org/review>
- Hung, H. (2015). Flipping the classroom for English language learners to foster active learning. *Computer Assisted Language Learning*, 28(1), 81-96.
- Kim, M., Kim, S., Khera, O., & Getman, J. (2014). The experience of three flipped classrooms in an urban university: an exploration of design principles. *The Internet and Higher Education*, 22, 37-50.
- Kong, S. (2014). Developing information literacy and critical thinking skills through domain knowledge learning in digital classrooms: An experience of practicing flipped classroom strategy. *Computers & Education*, 78, 160-173.
- Lage, M., & Platt, G. (2000). The Internet and the Inverted Classroom. *The Journal of Economic Education*, 31(1), 11-11.
- Lage, M., Platt, G., & Treglia, M. (2000). Inverting the Classroom: A Gateway to Creating an Inclusive Learning Environment. *The Journal of Economic Education*, 31(1), 30.
- Love, B., Hodge, A., Grandgenett, N., & Swift, A. (2014). Student learning and perceptions in a flipped linear algebra course. *International Journal of Mathematical Education in Science and Technology*, 45(3), 317-324.
- McLaughlin, J., & Rhoney, D. (2015). Comparison of an interactive e-learning preparatory tool and a conventional downloadable handout used within a flipped neurologic pharmacotherapy lecture. *Currents in Pharmacy Teaching And Learning*, 7(1), 12-19.
- Novak, G.M. (2011). Just-in-time teaching. *New Directions for Teaching and Learning*, 2011(128), 63-73.
- Roach, T. (2014). Student perceptions toward flipped learning: New methods to increase interaction and active learning in economics. *International Review of Economics Education*, 17, 74-84.
- See, S., & Conry, J. (2014). Flip My Class! A faculty development demonstration of a flipped-classroom. *Currents In Pharmacy Teaching And Learning*, 6(4), 585-588.
- Simpson, V., & Richards, E. (2015). Flipping the classroom to teach population health: increasing the relevance, *Nurse Education in Practice*.
- Singh, H. (2003). Building Effective Blended Learning Programs. *Educational Technology*, 43(6), 51-54.
- Tucker, B. (2012). The Flipped Classroom - Education Next. Education Next. Retrieved 5 January 2015, from: <http://educationnext.org/the-flipped-classroom/>
- Williams, C. (2002). Learning On-line: A review of recent literature in a rapidly expanding field. *Journal of Further And Higher Education*, 26(3), 263-272.