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Developing a flipped classroom framework to improve tertiary education students' learning engagements in India

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ABSTRACT

There is a large proportion of the population in India that has very limited access to higher education (HE). Of this, the northern states seem to worse off than their southern counterparts. The access to HE is further problematized by a lack of access to personal computers; however, there is a large proportion of the population that has access to mobile phone technology. Linked with this is the possibilities that the flipped classroom methodology could offer HE in North India; leveraging the affordances of mobile technologies. This paper reports on a preliminary, scoping study undertaken to understand the level of consciousness of a flipped classroom methodology in North India and if there is any appetite to see this trialed in HE classrooms. A qualitative research study was undertaken using a sample of 26 lecturers from different universities in Punjab, New Delhi and Maghalay. The results showed that participants, although not fully understanding it, generally had a positive view towards flipped classrooms. This suggests that it would be helpful to make teachers more aware of using the flipped classroom methodology and provide them with adequate training to adopt this methodology. It also suggests that using a social networking site (for example, WhatsApp), to help facilitate flipped classrooms might be considered.

Keywords: *Flipped classroom; North India; mobile technologies; higher education; flipped mobile framework.*

INTRODUCTION

Not surprisingly, with a population of some 1.34 billion people, India has an equally large number of HE providers, with 659 universities, 33023 colleges and 12748 diploma-awarding institutions, across three levels; central, state and private (Ernst & Young 2012). Despite this, only 20 million students (15% participation rate) are enrolled in universities for HE. Among them, 12% for postgraduate and 1% for research courses in different streams (Kharas 2010). These figures clearly point to a low tertiary education rate in the Indian population, compared to that of countries, such as Australia with a 36.6% participation rate and the USA with 41% (NCES 2019). For those living in the more rural areas of India, the participation rate drops to as low as 7% (Chakraborty & Konwar 2013). The socio-cultural factors at play here, in preventing students from undertaking tertiary education, are well documented but unfortunately the solutions are not as clearly identified (Bhattacharya, 2015; Battacharya & Sharma 2007). To help to quantify some of the inhibitors, Ernst and Young (2012) noted that insufficient infrastructure and facilities (for example, deficient library facilities, outdated curriculum and a shortage of lecturers) all contribute to India lagging behind in the context of HE. It has been posited by researchers that, to help to remediate these kinds of

access issues, Internet enhanced learning systems could make tertiary education more accessible to all (Balakrishnan 2010; Bostus, Mears & Williamson 2015).

To improve the HE system in India, the Government aims to increase the prevalence of Internet-based learning environments. In this regard, the concept of the flipped classroom seems to be appropriate as a tool for imparting education at the tertiary level in the Indian higher education context. However, this will take time and in the interim researchers are looking to other pedagogical approaches in teaching and learning that can help to facilitate a greater uptake of, and access to tertiary learning.

If Indian tertiary education institutions can integrate flipped classrooms in their teaching and learning systems, they will be well positioned to take advantage of the perceived benefits for students' learning at the tertiary level. For Indian tertiary education systems to realize the benefits of the implementation of the flipped classroom, it is necessary for the traditional education systems to query their practices. A traditional education system involves teacher-centred programmes that focus on the transmission of knowledge through lectures, printed textbooks, tutorials and assessment of students' learning based on end-of-semester examinations. The uptake of the flipped classroom has the potential to increase the scope and variety of students' learning by supplying them with new practices of Internet-based learning. This paper aims to prepare a flipped classroom model and framework to enhance Indian tertiary education students' learning engagements.

LITERATURE REVIEW

Internet-based teaching

In the context of the improvement of university students' learning, the Indian government has always aimed to establish more Internet-based teaching and learning programmes for HE institutions. For example, in 2004 the University Grant Commission (UGC) of India launched a mega program called the INFONET in order to provide Internet facilities to the Indian tertiary educational sector. However, it was also noted in the 12th five-year plan (2012-2017) that, to see further growth in this sector, improvement of the quality of Internet facilities in Indian tertiary education institutions should be expanded and prioritized by the government.

In the context of the use of the Internet for educational purposes in Northern India, a study conducted by Kaur and Manhas (2013) suggested that about 70% of higher education students studying at different colleges in North India perceived the Internet as useful, informative, easy to use, less expensive and a time saving learning mode. Further to this, the appropriate use of Internet resources helped tertiary education students to access the learning materials globally in the form of e-textbooks and online tutorials (Sandhu 2017). Therefore, implementation of the flipped classroom may enhance students' learning engagements through providing them with new Internet-based learning content. More important, Muesser (2015) states that a "flipped classroom offers a student-centred approach with more engagement and interaction, as well as self-directed learning using the online materials" (p.597).

Flipped classrooms

In this regard, the concept of the flipped classroom seems, on the surface, to be an appropriate methodology to be used in imparting education at the tertiary level in the Indian HE context (Sandhu, Singh & Sharma 2016). The flipped classroom is a classroom where interactive learning group activities and Internet-based individual instructions are provided to students. In the context

of this study, the definition that was adopted for flipped classrooms is that used by the University of New South Wales, which defines the concept in the following way:

In the flipped classroom, students complete learning normally covered in the classroom in their own time (by watching videos and/or accessing resources), and classroom time is dedicated to hands-on activities and interactive, personalised learning, leading to deeper understanding. Students use class time to apply the theory and concepts discussed in the videos, and to utilise techniques including group problem-solving and team building games, simulations, case study reviews, and group discussions (UNSW 2019).

It is suggested in this paper that the integration of the flipped classroom into the traditional teaching and learning system has the potential to enhance students' learning practices where students can learn at their own pace through pre-recorded lectures and videos (or audio). Nanclares and Rodriguez (2016) noted that there are two types of instructions: first, information transmission, where teachers and content design the main mode of delivering instruction and students are seen as the receivers of information; second, praxis where students learn through applying their own knowledge and teachers support them in their learning, providing students with guidance and feedback (Bishop & Verleger 2013). In flipped classrooms, both types of instructions can be used, which could further enhance the opportunity for students' learning. In the flipped classroom model students can attain technology-based instruction (praxis) and instructors or teachers can then help them to apply their knowledge.

There are many studies that demonstrate successful introduction of the flipped classroom to tertiary education students in developed countries (for example, Butt 2014; Strayer 2012). Furthermore, the application of flipped classrooms to learning processes has resulted in new innovative and flexible learning opportunities for students. For example, in a study Albert and Beatty (2014) demonstrated that the flipped classroom model impacted positively on HE students' learning engagements because students got an opportunity to understand the content prior to class and this enabled them to participate more actively when attending their face-to-face lesson. In this way, the flipped classroom enhances students' active learning participation, collaborations and in-class communications. Zappe et al. (2009) further suggested in their research that the integration of the flipped classroom into teaching and learning has improved students' problem-solving and learning skills. However, in the Indian context, flipped classrooms are not adequately integrated into students' academic life, when compared to their Western colleagues (Sandhu, Singh & Sharma 2016), and to a great extent this methodology may not even be fully understood by teaching staff members. Therefore, this paper focuses on examining Indian lecturers' perceptions and experiences in using the flipped classroom model in order to enhance HE students' learning engagements.

Access to digital devices

The lack of access to digital devices (for example, computers, laptops, iPads, tablets and other android devices) in Indian HE institutions (Sandhu 2017) can also be a reason for the inadequate integration of flipped classrooms in India. Portable computer devices equipped with Internet facilities provide easy access to learning content (Sun, Wu & Lee 2017). In this context, Barton et al. (2015) found in their experimental study that the use of iPads enhances the learning opportunities for tertiary education students. The use of the latest digital technologies (tablets, iPads, laptops and other android devices) in the tertiary education sector makes the learning process easy and convenient (Cismaru & Cismaru 2011; Kay & Lauricella 2010). For example, in a qualitative study conducted among university students in North India (Sandhu 2017), it was found that all of the participants used mobile phones to access the Internet and online learning materials

during their college hours. This understanding provides hope that an opportunity may exist to use devices, such as mobile phones, as a tool, to flip the traditional classroom.

Social networking applications

Social networking applications (apps) such as WhatsApp can be used to challenge the culture of education and to improve student engagement in India. Both teachers and students can easily access the social networking apps (such as WhatsApp) on their mobile phones, therefore, content can be accessed by students on their mobile phones via WhatsApp rather than needing to access a computer. For example, in India, 96% of smartphone users use WhatsApp on their phones (D'Cunha 2018). It follows then that one suitable use of WhatsApp is its potential to help deliver flipped classroom content and communications directly to the student, without the student needing to navigate a website. Interestingly, in a recently released report about the results of the 12th Annual Digital Learning Tools survey, Hart (2018) ranked WhatsApp at number 12 in the Top Tools for Learning in 2018.

In this context, Stone and Logan (2018) conducted a study of the use of WhatsApp in online learning by students studying at the Institute of Education at Dublin City University (DCU). Results indicated that the widespread use of WhatsApp provided students with an opportunity to connect with and to develop a learning community where both teachers and students can post, share and exchange learning materials. In this way, in a country like India, where more traditional digital devices (computers) equipped with the Internet are not readily available to students at their universities, Internet enabled mobile devices linked with social networking sites such as WhatsApp, can be used to support a flipped classroom approach. In a study, Willemse (2015) reported that teaching and learning discussion groups could be created on WhatsApp to enhance the integration of educational theories and practices.

For Indian tertiary education systems to realise the benefits of the implementation of the flipped classroom methodology, it is necessary for the traditional education systems to query some of their existing practices. A traditional education system involves teacher-centered programmes that focus on the transmission of knowledge through lectures, printed textbooks, tutorials and the assessment of students' learning based on end-of-semester examinations. In this way, teachers are seen as the expert, the holder of the knowledge, and they play an essential role in the whole teaching learning process (Sandhu, 2016). The adoption of flipped classroom methodology has the potential to increase the scope and variety of students' learning through enabling them (students) to gain the information in advance. Doing so provides the opportunity to transform the role of the teacher during lecture sessions from teacher focused, that is, the deliverer of content, to one that is student focused, where the teacher takes an active role in providing helpful feedback and explanation, extending knowledge, as well as motivating and encouraging students to engage, debate and challenge the topic through conversation.

Research proposition

To help the researchers to understand the potential of promoting a flipped classroom model in the North Indian context, this preliminary study was conducted to determine teachers' understanding and perceptions of this methodology. Then, having gained an initial understanding of this from a range of teachers, the researchers propose a model and framework that could be trialed to enhance North Indian tertiary education students' learning, using a flipped classroom methodology more specifically, one based on the use of a mobile device to deliver core learning content and communications.

RESEARCH DESIGN AND METHODS

A short, preliminary qualitative study was conducted across a sample of 26 lecturers, recruited from different universities in Punjab (19), New Delhi (4) and Meghalay (3) in India. The study was undertaken under the auspices of the Australasian Society for Computers in Learning in Tertiary Education (ASCILITE) Community Mentoring Program (ASCILITE 2018) and the sample was selected from former colleagues and based on the professional relationships between the lead researcher and their former PhD supervisor. The sample, although not extensive, provided sufficient data to enable an analysis of the different perspectives held by teachers towards a flipped classroom methodology; one that could potentially be used in universities to maximise students' learning engagement. An open-ended survey was used to collect the data on six key questions. This methodology was chosen as it provided respondents with the freedom to explain their experiences and opinions about this specific topic, in order to gain foundational information (Sproull, 1988). A Google form and a Microsoft Word document were sent via email and WhatsApp to lecturers. The collected responses were subsequently analysed bringing together the predominant themes from their responses. The following questions were framed to try and maximise the potential for open and frank responses:

- (1) Considering the definition [provided above], how would you define the flipped classroom model? (What else would you add to this, or say/do differently)?
- (2) How do you think applying a flipped classroom model would enhance your students' learning? Please provide as much detail as you can so that we can understand your context.
- (3) Would you consider using the flipped classroom approach in your teaching, above a more traditional teaching approach? If so, please explain why you would, or wouldn't use this approach?
- (4) Have you ever used a flipped classroom method? If 'yes', what did this look like (what did you do)? If 'no', is there a reason why you have not, or would not use this method?
- (5) Considering the context of North India, what do you think would be the main reasons a teacher would be hesitant to adopt a flipped classroom method as their main approach to teaching (rightly or wrongly)?
- (6) What aspects of the flipped classroom model do you think your students would struggle with? Consider the changing role of students and facilitator, how students engage with pre-class material, and when in the class space.

Data analysis

For the data analysis, a code-based analysis method was used. This analysis method enabled the researcher to reduce the text into manageable summary/chunks to describe research participants' experiences and opinion towards a specific topic or fact (Jackson et al, 2002). As in the Jackson study, we described lecturers' experiences and opinions towards implementing the flipped classroom approaches over the traditional teaching and learning methods; and subsequently the analysis considered a range of emergent key themes.

There were two stages used to analyse of the data; in the first stage, major themes were coded in each survey response. The words and phrases were coded based on the frequency of occurrence of certain words and phrases. At the second stage, all codes were re-coded alongside the same codes in the other survey responses to ensure similarity (authenticity) in the coding. For example, most of survey participants mentioned that "flipped classrooms will help to create independent learners", the data was coded as "flipped classrooms and independent learners".

ANALYSIS AND DISCUSSION

Understanding the potential for the flipped classroom methodology in North India

To understand the potential for the flipped classroom methodology in North India, it was essential to analyse teachers' perceptions on the use of this methodology. In this study, most of the participants (22 of 26) defined the flipped classroom as a blended mode of learning where students can learn through accessing online videos and other learning materials. At this level, flipping a classroom could thus enable them to provide their students with easy access to learning material outside their traditional classrooms (Sams 2011). However, it was found that some participants only repeated the definition provided to them in the survey document. This did not add any different perspective based on their own experiences, which casts some doubt on their true understanding of this concept. A small number of them (4) did not explain anything about the flipped classroom. This indicates that these participants may lack a general understanding of the concept of flipped classroom, for as one participants said, [s/he] "*Came across the concept from the [your] cited definition*" (Survey excerpt).

In the context of implementing the flipped classroom model to enhance students' learning, most of the participants were of the opinion that flipped classrooms would help to create independent learners, whose education can be optimized by accessing both online and offline modes of learning. Thus, flipped classroom could provide students with an opportunity to become active learners, where they can gain a deeper understating of the content matter (Sankey & Hunt 2014). Further to this, in a scoping review on the use of flipped classroom, O'Flaherty and Philips (2015) argued that for the optimum use of the flipped classrooms and for a better understanding of the concepts, it is an essential requirement for students to complete the preparatory tasks prior to attending the class (Strayer 2012). However, four of the participants said they have no idea how the flipped classroom could impact on students' learning as they have never implemented it. In this case, it seems that some of the participants did not feel competent enough to flip the traditional classrooms and prepare their students to benefit from this approach.

In addition, when participants were asked, if they would to use the flipped classroom, some of them indicated they would prefer to use both the flipped classroom and traditional modes of teaching and learning. Implementation of the latest teaching approaches (such as, flipped classrooms) other than traditional lecture could be more effective to enhance student learning engagements (O'Flaherty & Phillips, 2015). However, eight (31%) of the participants were unsure about using the flipped classroom because they had no experience of using it in their teaching. These findings indicate that despite having a positive opinion about using the flipped classroom, lecturers were hesitant to use this as a single teaching mode and they would prefer to use it in combination with traditional and online modes.

Another concern participants identified was how they would assist students to engage. It was felt that students would struggle with the flipped classroom environment. Most of the participants stated that to maximise students' participation in the flipped classroom, an adequate orientation and awareness should be provided to students. Participants were of the opinion that because students were not familiar with the flipped classroom model they may get distracted by social networking sites and therefore waste their time.

There was also some concern relating to adequate access to computer technology to help facilitate this. As Strayer (2012) suggested, flipped classroom can only be successful if it is implemented on technology-skilled and aware learners. Therefore, this study suggests it is essential to make students aware of the concept of the flipped classroom and train them in how to make the optimum use of it.

Awareness among teachers of using the flipped classroom method

In the context of the practical use of the flipped classroom, 22 participants (85%) said they had never used it and only four participants had fully, or partially implemented flipped classroom methods for their teaching. In order to explore the reasons behind *no use* or *less use* of flipped classroom methods in the North India context, participants highlighted the following reasons: teachers' lack of understanding and awareness about the flipped classroom methods, their negative attitude towards online learning, lack of adequate training in using flipped classroom methods, poor infrastructure, and in some cases the age of teachers was a barrier that prevented them from adopting new modes of teaching.

The results indicate that most of the participants were not aware of the concept of flipped classrooms and they still prefer to use the traditional classroom approaches where students are seen as passive listeners and teachers play a dominant role in the teaching and learning process. Therefore, for the successful implementation of flipped classroom models in North India, similar to the findings of Sandhu, Singh and Sharma (2016) this study suggests that, if teachers are to adopt flipped classroom approaches, it is essential that training and support be provided. The teachers' awareness of using online teaching modes (for example, flipped classrooms) helps to improve teaching skills (Ercan & Tekerek 2012), and teachers with a positive Internet attitude motivate their students to use online learning tools for their learning (Bozdogan, Usta & Yildirim, 2007). In developed countries, Internet-based programmes such as online classes, certificates and degrees are increasingly provided to teacher trainees to help them be more effective teachers (Bostus et al., 2015).

The data showed that some of the research participants felt that adequate technological facilities for teaching and learning were not available in India. The lack of adequate technology facilities could be a reason for the lack of, or limited use of, flipped classroom methods in Indian HE. Similar to these findings, Ilo and Ifijeh (2010) reported that in developing countries like India there is a lack of technology, more specifically Internet facilities for educational purposes in comparison with developed countries. To implement the concept of the flipped classroom effectively, availability of the technology is essential as the use of the latest digital technologies (tablets, iPad, laptops and other android devices) in the tertiary education sector makes the learning process easy and convenient to access (Cismaru & Cismaru 2011; Kay & Lauricella 2010).

Use of social networking sites in flipping traditional classrooms

In the Indian context, the lack of digital devices and poor Internet access in higher education institution (Sandhu 2017) prevent both teachers and students from experiencing optimum benefits from online teaching and learning modes. Furthermore, Sandhu (2017) indicates that students access the Internet on their personal mobile phones for their learning purposes in their universities and educational institutes. Through the combined use of a mobile friendly open source learning management system (LMS) and free (encrypted) social networking tools, there is an opportunity to challenge and improve the more traditional approaches to providing educational opportunities with a view to improving student participation and engagement. As social networking sites, for example WhatsApp, is a widely used app in India and 96% of users of smartphones use WhatsApp (D'Cunha 2018), there is a potential to use this social networking app to promote the concept of the flipped classroom in India. In this regard, Willemse (2015) suggested that an appropriate use of WhatsApp can enhance students' learning engagements as students could easily share and collect information via WhatsApp. Teachers can provide their students with online links to assignments, short videos, learning materials and other relevant course materials via WhatsApp. In this context, India Today (2017) has published that there is a need to promote the concept of Mobile-Based learning and Video-Based learning in educational institutes, as it will help to promote the concept of independent learning in India. In the Indian context, students are seen as the passive

listeners/learners, however, in order to foster the concept of independent learning, Indian university students must make use of different delivery methods such as available via their Learning Management Systems. In Australian institutions, Learning Management Systems such as Moodle facilitate this and in this project the flipped classroom model for Indian universities will be based around the use of Moodle and WhatsApp on mobile devices.

There are a number of research studies (for example, Gon & Rawekar, 2017; Sayan, 2016; Gachago et al, 2015; Cetinkaya, 2017) the findings of which prove that the appropriate use of WhatsApp in HE can improve the teaching and learning process. For example Gachago et al (2015) conducted research among three university lecturers in South Africa to analyse their perspectives toward the use of WhatsApp in HE settings. Findings revealed that providing students with the access to learning content via WhatsApp facilitates the learning process, as it reduces the physical and geographic boundaries. Further to this, Gon and Rawekar (2017) mentioned in their research that the learning material can be made available to students anywhere via WhatsApp which makes the learning process easier and more convenient. When using WhatsApp, different learning groups can be created where both teachers and students can participate. In this way, the features of WhatsApp, for example read-ability, write-ability, listen-ability, watch-ability and share-ability can be used to enhance the learning engagements where both lecturers and students can share information and communicate quickly (Bower, 2008).

Proposing a Flipped Classroom Model

As the study highlighted, participants lack the basic understanding of flipped classrooms, and to progress this further would require them to possess a much broader understanding of the benefits of implementing the flipped classroom model among teachers and students in North India. In developed countries like Australia and the United States, universities have been successfully implementing flipped classrooms for a number of years (Strayer 2012) and it helped to enhance students' learning engagements by providing them with preparatory work which in turn encourage students interactively in classrooms (O'Flaherty & Phillips 2015). Figure 1 below shows a flipped classroom framework and model that lecturers could use and test. It illustrates that certain content designed for knowledge transfer, such as podcasts, video content and OER can be made available (sent) directly to the mobile device. Aligned with this, the social networking app may also be used to facilitate conversations, and for the sharing of links and ideas. Using an LMS that is mobile responsive would also increase the usability of the mobile phone when accessing course based information and resources.

This model suggests that an approach that takes advantage of student's access to mobile devices may be a better way to communicate core-teaching ideas prior to attending class (Gachago et al, 2015). This model, linked with current affordances is being proposed to progress, promote and trial with teachers in Northern India.

LOW BANDWIDTH FLIPPED CLASSROOM MODEL

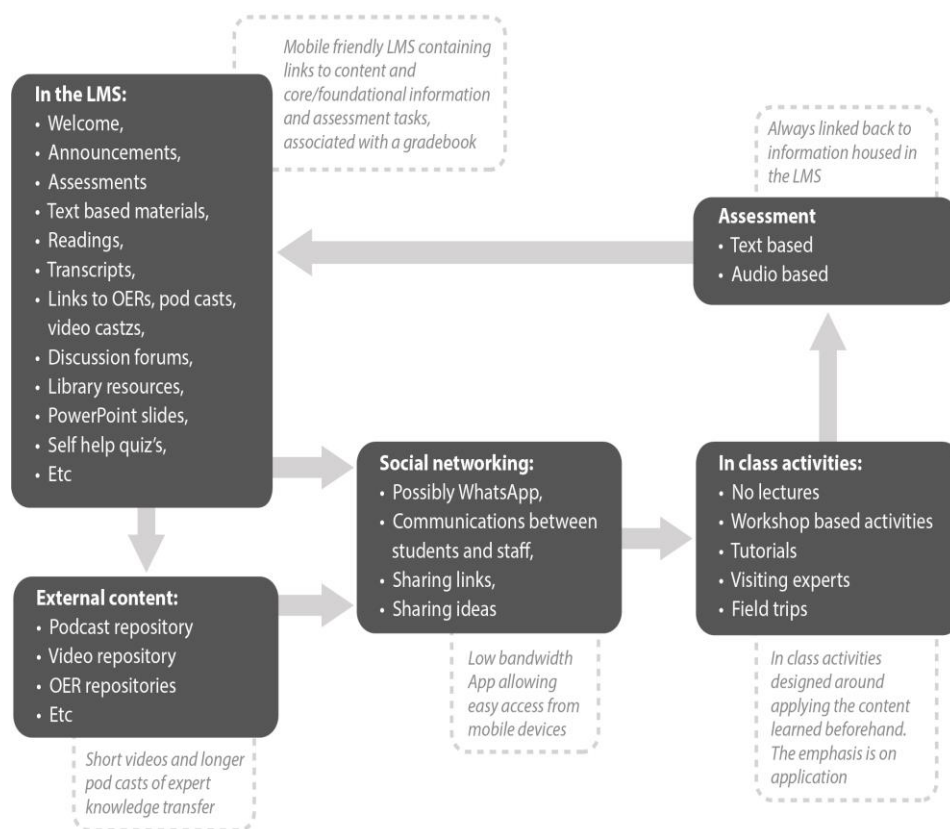


Figure 1: Flipped Classroom Model

Description of the Low Bandwidth Flipped Classroom Model

Through the LMS, the low bandwidth flipped classroom model can be made accessible to both teachers and students. The various classroom-based activities starting with the welcome sessions, introduction of the course/s and announcements related to the units can be provided to students through the flipped classroom model prior to attending the actual classroom session. The pre-class learning resources will equip students with unit content in preparation for the teaching sessions. In flipped classrooms, the text based material, reading resources and transcripts can be provided to students and the students will have the freedom to access them at their convenience, thus providing the flexibility to access learning at a time that works for them. Learning content can be provided in the form of links to OER, pod casts, video casts and audio presentations and made available so students can prepare for upcoming teaching sessions and learning activities. Learning resources can also include tasks and activities for students to complete. Tasks could include quizzes, interactive activities, and self-reflection statements relevant to the content that extend their knowledge and prepare them for the teaching sessions and assignments.

To foster the concept of independent learners, discussion forums are included in the model. Discussion forums will provide students the opportunity to share, discuss and challenge their ideas,

ask questions and deepen their understanding. Lecturers can also post course related materials such as a video and ask students to discuss certain aspects. Alternatively, in response to questions from students, lecturers can post a video to clarify their questions. Providing learning material prior to teaching means that lecturers do not have to use precious lecture time transmitting content, instead they can use this time to facilitate workshop-based activities and discussions that extend students' knowledge and understanding that challenge their perceptions.

In the North Indian context, poor Internet access and insufficient Internet provision (high Internet cost, few computers and network errors) hinder tertiary education students from using the Internet for their studies (Sandhu 2017; Kaur & Kumar 2005; Kumar 2010). For example, if students do not have good Internet access and they experience frequent network errors, this creates problems in using the Internet for their studies. Indian students also have little knowledge about how to use the Internet to improve their learning (Kumar 2010). Therefore, the study tentatively commended using social networking sites, for example WhatsApp to provide a space for discussion. As previously mentioned, in India, 96% of people use smartphones that could be used to access WhatsApp (D'Cunha 2018). Therefore, there is the possibility to provide students with access to the LMS via their mobile device to access flipped classroom learning materials, whilst other materials could be sent directly to the mobile device via WhatsApp. Different features of WhatsApp (read-ability, write-ability, listen-ability, watch-ability and share-ability) can be used to create learning groups where both lecturers and students will be allowed to share information, create discussion forums, communicate with and provide feedback to each other. Therefore, an appropriate use of WhatsApp can enhance students' learning engagements as students could easily share and collect information via WhatsApp (Willemse 2015).

LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

Despite collecting the data from three Indian states, this study has a deliberate regional bias, as most of the data was collected from the Punjab state in North India. In future research, the geographical coverage can be expanded through obtaining data from the other states of India to make the data more comprehensive. Second, a small sized sample (26 participants) was used in this study as it was only a scoping or preliminary study. Future research may increase the sample size to get broader views about using the flipped classroom methodology in the Indian context. Third, the study mainly focused on tertiary education lecturers. For a better understanding of flipped classrooms in teaching and learning processes, future researchers can focus on both teachers and students.

CONCLUSION

Flipping the traditional classrooms has potential to improve the tertiary education system in North India. This study showed that participants, although not fully understanding it, generally have a positive perception towards flipped classrooms and were able to explain the flipped classroom as an online mode of learning which can help to create independent learners. However, most of the participants were not overly aware of the concept of flipped classroom and they had never used it in their own classrooms. Participants also showed a lack of basic understating of using the flipped classroom. Some of the participants indicated that if they were provided with an opportunity to flip their traditional classrooms, they would prefer to use both flipped classroom and traditional modes of teaching and learning.

Teachers' lack of understanding and awareness about the flipped classroom methods, their negative attitude towards online learning, lack of adequate training in using flipped classroom methods, poor infrastructure, and sometime the age of teachers were the factors associated with *no use* or *less use* of the flipped classroom in this study. Therefore, the study suggests that it would

be opportune to help make teachers more aware of the affordances of using flipped classroom model and provide them with adequate training in adopting the flipped classroom methodology.

In addition, the study suggests using the social networking sites (for example, WhatsApp) to promote the concept of the flipped classroom in India and a flipped classroom framework and model has been created for use by Indian tertiary education lecturers. The model provides the basic understanding of the flipped classroom which lecturers in Indian universities can test through the use of mobile technologies.

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