



Proceedings of the Informing Science + Information Technology Education Conference

An Official Publication
of the Informing Science Institute
InformingScience.org

InformingScience.org/Publications

July 31 - August 5 2017, Ho Chi Minh City (Saigon), Vietnam

ENHANCING STUDENTS' LEARNING THROUGH EARLY CLASS PREPARATION

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ABSTRACT

Aim/Purpose	Development of a conceptual model linking early class preparation to improve class participation and performance.
Background	Class preparation and class participation are precursors for the students' performance.
Methodology	Literature review
Findings	In a student-centered class environment, class preparation remains essential for the successful collaboration and participation. The literature review in this stream reveals that little attention has been paid to undergraduate class levels.
Recommendation for Researchers	The literature review shows that there is a need for more research using undergraduate classes.
Future Research	Validation and application of model in different educational program and discipline settings
Keywords	class preparation, class participation, conceptual model, grade performance, active learning, flipped-classroom

Accepted by Executive Review by Editor: Eli Cohen | Received: May 15, 2017 | Revised: May 16, 2017 | Accepted: May 18, 2017.

Cite as: Nkhoma, C., Nkhoma, M., Ulhaq, I., & Sang, M. Q. (2017). Enhancing students' learning through early class preparation. *Proceedings of the Informing Science and Information Technology Education Conference, Vietnam*, pp. 85-95. Santa Rosa, CA: Informing Science Institute. Retrieved from <http://www.informingscience.org/Publications/3756>

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INTRODUCTION

Digitization and the internet have reshaped the education field from a traditional delivery to an inverted or flipped class-room. The inverted or flipped class room approach divides the learning content into pre-learning(outside) and within the classroom (in-class) discussions, therefore, lets the teachers and students interact and work on factual problems, solving schemas within the class instead of going through the slide contents (Lockwood & Esselstein, 2013). The inverted class room is seen as an attractive practice within several disciplines due to its practical objective in the direction of highest levels of learning achievements (Suleman & Gruner, 2016). Although seen as an increment of workload for the teaching staff, the practice of blended learning has yielded positive impacts on learning and high grade achievements (Lockwood & Esselstein, 2013; Park, 2016; Phillips, Schumacher, & Arif, 2016; Suleman & Gruner, 2016).

In order to achieve in-class participation at a higher scale, early class preparation is a key imperative and part of flipped class strategy. Recently authors have started appreciating that pre-class activities such as online short lectures, peer to peer group activities, and preliminary readings are essential for class participation (Parappilly, Schmidt, & De Ritter, 2015; Phillips et al., 2016). In addition, pre-class preparation improves the self-regulation, problem solving, and positive examination performances (Moravec, Williams, Aguilar-Roca, & O'Dowd, 2010; Tanner & Scott, 2015). Therefore, class preparation is the key for success of all class participants in flipped class environments (Suleman & Gruner, 2016).

Results from these studies show that for class participation and students' knowledge of basic concepts make them confident to share information, feedback, and participate in the practical and problem solving activities more effectively. In addition, class participation has been seen as a central construct to improve learning outcomes. Literature to date points out that most work in this area is limited to the high-school level. Recently some of the authors have studied the positive impact of class participation and emphasized the need for early preparation of students.

LITERATURE REVIEW

The flipped class room technique has been increasingly recognized in many institutions. Recently, the traditional lecture and classroom approach is being criticized due to the passive mode of learning and lack of students' engagement in class activities. This criticism has given birth to more student-centered approaches and the flipping of the basic and easily understandable content being made available to the students before they come into the class (Becker & Watts, 1996; Lage, Platt, & Treglia, 2000; Lockwood & Esselstein, 2013). According to Lockwood and Esselstein (2013) the expected benefits of the flipped classroom approach are that students learn at their own pace, and teachers can inquire and engage the students more in the class room. However, to implement this model successfully, class participation and preparation are important aspects. Table 1 posits the differences between the traditional class-room as discussed and tested by Szparagowski (2014).

Table 1- Traditional vs flipped-classroom adapted from (Szparagowski, 2014)

Dimensions	Traditional approach	Flipped Approach
Instruction	Scripted, monologue	Dialog, collaborative
Activities	delivery of material and slides	Problem solving, inquiry discussions
Level of commitment	Teachers only	Students and teachers
Learning outcomes	Information delivery, covers very limited blooms taxonomy	Knowledge construction through synthesis, application, judgement
Student's participation	Individual	Individual and Group work
Teacher role	Solo Performance	Facilitator, reviewer and moderator
Learning environment	Lethargic, Uninterested, low morale	Creative, cooperative and innovative, motivated

CLASS PREPARATION

Students' preparation for class is an essential component of their college education. There simply is not enough time in class to accomplish the learning objectives for most courses (Ewell & Rodgers, 2014). Indeed, significantly higher grade point averages are associated with students who are presented with written material before oral presentations than with students who were presented with written material after oral presentations (Terpstra, 1979). However, research shows that several reasons, such as clumsy clicks on mobiles (McFate & Olmsted, 1999), lack of motivation (Brink, 2013), or low aptitude towards learning due to lack of accountability (Ewell & Rodgers, 2014; Nilson, 2003), are common problems impeding student's class preparation and learning. For example, students were reported to complete less than one third of the assigned reading (Clump, Bauer, & Bradley, 2004; Murden & Gillespie, 1997). Other researchers have confirmed that students often fail to read assignments adequately prior to their due date (Marchant, 2002; Sappington, Kinsey, & Munsayac, 2002), particularly when reading is not formally assessed (Connor-Greene, 2005). A study on students' non-compliance with assigned readings from 1981 through 1997 was carried out by Burchfield and Sappington (2000). Based upon student performance on pop quizzes, they found that student preparation dropped 80% over this 16-year period. Sadly, there is no reason to believe that the trend will reverse itself with increasing numbers of distractions facing today's students. College professors were prone to facing a lot of competition for students' time: "socializing (virtual, phone, or face-to-face), watching television, listening to music, surfing the web, drinking, sleeping, working out, reading a novel or magazine, doing more interesting or important coursework, or engaging in extracurricular activities such as clubs and sports" (McFate & Olmsted, 1999; Nilson, 2003).

Even with careful selection of readings and assistance in reading them, student motivation to read for class may need to be enhanced by accountability mechanisms. Students must do the readings for extrinsic reasons – that is set up incentives and sanctions related to their own self-interest. Students can be induced to read for class by quizzes on the readings, oral presentations on the readings, in-class problem solving or written exercises on the readings, and homework on the readings (Ewell & Rodgers, 2014; Nilson, 2003). An early class reading strategy used in cell biology classes produced positive outcomes in the generation of new knowledge, in class engagement with peers and for assessments (Moravec et al., 2010). Results of this study showed that the learning before lecture (LBL) strategy improves students' accuracy in answering final examinations questions.

Many instructors utilize quizzes over assigned readings and have demonstrated their effectiveness in increasing student compliance (Boyer & Christensen, 2013; P. A. Connor-Greene, 2000; Marchant, 2002; Ruscio, 2001; Thompson, 2002; Thorne, 2000). Recent results of quizzes in accounting classes have had a positive impact on class preparation and improvements in GPA, and worked as an early warning sign for the students (Boyer & Christensen, 2013; Brink, 2013). Furthermore, preparatory quizzes were viewed as a verifiable approach for university entrants for preparation of complex and practical courses in their first semester (McFate & Olmsted, 1999). However, there are some problems associated with quizzes. Students often perceive them as punitive (Thorne, 2000). Quizzes worked on the day they took place but had no appreciable effect on other days. Only low-order cognitive skills such as knowledge and comprehension can be engaged with a quiz. Quizzes negatively affect the building of a community of scholars engaged in active learning. Although effective for grade-conscious students, quizzes do nothing to foster deeper learning in the higher education (Ewell & Rodgers, 2014; Palmer, Zajonc, & Scribner, 2010).

According to the few studies of the comparative effects of the expectation of random versus voluntary oral questioning, preparation for classes is greater among students who expect to be called on at random (McDougall & Granby, 1996). These findings have been demonstrated among community college students enrolled in an introductory psychology class (McDougall & Cordeiro, 1993) and among undergraduate education majors enrolled in a test and measurement class (McDougall & Cordeiro, 1992).

One explanation for this result is the tendency for the same individuals to volunteer in answering questions. This behavior makes it more difficult for reserved students to contribute to the class, causing these students to become frustrated and disinterested (Spies & Wilkin, 2004). Also, students exposed to random oral questioning learn that they will be held accountable for their level of preparation during each class, whereas students exposed to only voluntary oral questioning learn that they will be held accountable much less frequently (e.g., examinations) (McDougall & Granby, 1996). Finally, another benefit in the use of random oral questioning is the potential to increase a student's retention of the material. McDougall and Granby (1996) found that students who expected random oral questioning expressed greater confidence in their reading recall. In addition, Christensen (1989) found that random questioning increased student confidence, subsequently causing students to volunteer answers, offer comments, and ask questions more readily. One potential danger with this tool is the risk of rehashing the readings to such an extent as to obviate the need for students to do the readings. This risk is especially acute with prepared presentations, but the danger of encouraging free riding off the best students' vocalizations is always present with this technique. In addition, even with the cold-call method, the additional inducement for students to prepare seems minimal in that typical classroom discussions and activities already require knowledge of the reading (Ewell & Rodgers, 2014). Moreover, it was argued that it may be asking too much of our students to demand that they comprehend difficult texts on their own and then demonstrate that comprehension through class presentations. Students may need guidance that a simple assignment to "present" the reading to the class lacks (Green & Rose, 1996).

Others have recommended graded questions (Uskul & Eaton, 2005) or written assignments (Connor-Greene, 2005) to encourage students to complete readings and to think critically about the material, and this can promote active engagement on a higher cognitive level with the reading (Ewell & Rodgers, 2014). The course preparation assignment (CPA), an especially effective means to foster students' learning outside of class is setting homework on the readings (Ewell & Rodgers, 2014). Green and Rose (1996), for example, report favorable outcomes with the use of study questions to guide student reading of difficult texts. The reading, thinking, and writing the students do to complete the CPA prior to class was found to provide a solid foundation for high-level engagement with the course material (Yamane, 2006).

CLASS PARTICIPATION

The term classroom participation has multiple meanings and has become an evolving concept due to the changing landscape in teaching and learning (Loftin, Davis, & Hartin, 2010). Classroom participation is the mechanism and utilization of best practices to foster a better classroom experience. Class participation has been seen through the two main perspectives: student's perspective (Loftin et al., 2010; Mustapha, Rahman, & Yunus, 2010) and also teacher's perspective (Mustapha et al., 2010).

There are two dimensions to classroom participation: passive and active. The passive dimension of the class is the traditional approach covering teaching only activities and less attention is paid to the students' participation (Loftin et al., 2010; Szparagowski, 2014). The second type of class participation is active participation which provides intuitions to understand the important facets of students learning experience and related realities (Mustapha et al., 2010). Class participation remains at peak when active learning takes place and students participate in generative activities (Szparagowski, 2014). Generative activities include self-explanation, quizzes or tests, coming up with questions, discussions, or writing an essay and problem and inquiry-based learnings (Pashler et al., 2007; Roediger, Putnam, & Smith, 2011; Szparagowski, 2014).

The teacher's role remains pivotal in achieving an elevated level of engagement. Instructors should consider including generative activities, class management techniques, and understanding students' personal interests when promoting student engagement. Activities such as instructor's general guidelines for the management of the course promote class participation (Schuelke, 1972). Weaver and Qi (2005) provide several key recommendations for enhancing class participation comprised of setting

expectation from students, open ended questions, question preparation for each session, setting and assessing class environment, re-arranging students, and learning students' names. Introducing subject matter relevant to students' personal and professional interests is one way to enhance student discussion of the subject matter (Schuelke, 1972). When students can see a connection between what is being discussed and issues in their own lives, they may be more likely to actively engage in class discussion. After attempting to establish subject-matter relevancy, instructors should then create a discussion climate that provides extensive opportunity for students to engage in discussion. One suggestion would be to initiate discussion early in the class period, which may be critical to having robust discussion at later points in the class period (Foster et al., 2009).

Students' involvement in active learning is a very important aspect for overall class performance. This includes class discussion, homework assignments (Boniecki & Moore, 2003), and commenting on activities also lead to expansion of discussions (Foster et al., 2009; Howard, James, & Taylor, 2002). Howard et al. (2002) perceive active engagement as a matter of understanding of students' self-responsibility. In fact, at the extremes, some students participate frequently in large classes, whereas others seldom or never voluntarily participate (Foster et al., 2009). In addition, Howard et al.'s (2002) analysis further indicates that non-talkers (those who make fewer than two comments per class session), compared with the active talkers in the class, remain shy. Weaver and Qi's (2005) survey results show that only a very small cohort of 12% of the students participates in class discussions on regular basis.

Class participation can be categorized into three themes: teacher's influence, other class student's influence, and environmental influence (Loftin et al., 2010). Teachers are responsible for creating the collaboration conducive to learning and problem solving; class peers provide the supportive efforts and motivate others to participate in class activities. Class configuration and class size also impacts the level of learning and engagement. Students in small sized classes are easily reachable whereas in large classes and theaters students often remain invisible. The role of communication and interpersonal collaboration is essential to class participation. Students with higher confidence in communication have a higher degree of learning and success in the classes.

There are several barriers and enablers of class participation. Among encouraging factors, the lecturer's support and classmates' behavior are highest in the ranking (Mustapha et al., 2010). Supportive lecturers enhance classroom participation and improve the students' level of engagement by ignoring their mistakes (Mustapha et al., 2010). Their open-mindedness and friendly attitude create an open learning environment (Weaver & Qi, 2005). Supportive classmates also add to the confidence levels and influence others to participate through their positive attitude, thus diminishing their shyness and also by acknowledging their participation (Mustapha et al., 2010). Class participation can also be enhanced by means of motivational aspects such as using tokens and credits as incentives (Boniecki & Moore, 2003; Sommer & Sommer, 2007), calling students by their names, and providing feedback on answers (Mustapha et al., 2010). Shyness and lack of knowledge about the subject matter are commonly found in the classes as impeding students' participation (Howard et al., 2002; Mustapha et al., 2010). Mustapha et al.'s (2010) work on classroom engagement found that classmates' negative attitude and noise in class impact the class participation. Furthermore, this study found that poor teaching skills, rudeness, and unfriendliness discourage open communication in the class (Mustapha et al., 2010). Table 2 lists the barriers and enablers of class participation.

Boniecki and Moore (2003) stated that tokens and credit encouraged students to become engaged in class discussion. Similarly, Sommer and Sommer (2007) also increased class participation by giving a small amount of course credit for class participation on alternate days. Participation increased on both credit and noncredit days but was significantly higher on the credit days (Sommer & Sommer, 2007). However, because neither of these studies specifically targeted initially low responders, there is no information whether such students found credit for class comments highly reinforcing (Foster et al., 2009). However, to date, several studies have shown the passive attitude of students in the classes (Mustapha et al., 2010).

Table 2: Factors for class participation adapted from
(Howard et al., 2002; Loftin et al., 2010; Mustapha et al., 2010; Sommer & Sommer, 2007)

Influencers	Enablers	Barriers
Teacher	Walking around the room, Informal interaction & close physical proximity, Remembering student name	Lack of eye contact, displaying negative body language, facially expressing displeasure, Lack of answering ability, humiliating repose to peers
Classmates	Verification and Support	Discouraging reaction, Interruptions, Distractions (whispering, texting, other annoyances), Negative feedback
Environment	Configuration and size of the class room	
Student	Experience of communication, Credits and incentives	reluctant to speak up, hesitation and shyness, lack of confidence

Although awarding credit for participation sounds like a straightforward way to improve class discussion, keeping track of individual student comments while conducting class discussion could prove unmanageable for an instructor. In examining a way to make assessment of class participation more manageable for the teacher, Krohn et al. (2008) had students record their own comments in class. The number of self-recorded student comments generally agreed (75–80% agreement) with the number of comments recorded by observers. Disagreement regarding number of comments usually resulted from students' under-recording their comments, resulting in very few instances where students claimed unwarranted credit for participation. Krohn et al.'s (2011) self-recording procedures proved sufficiently reliable and manageable with large classes for us to evaluate those procedures specifically with the lowest responders in large classes.

The percentage of initially low-responding students who subsequently participated in class discussion was moderately increased by giving a small-amount of course credit for self-reporting up to two comments each class session; treatment effects were consistent when low-responding students were considered as a group; treatment effects were inconsistent when participation of low-responding students was considered on an individual basis, and a small amount of credit for participation was not sufficient to mobilize participation from the most reticent students (Foster et al., 2009).

HYPOTHESIS DEVELOPMENT

CLASS PREPARATION AND CLASS PARTICIPATION

Hypothesis 1: Class preparation positively increases class participation.

The work that students do prior to class allows for their active participation in learning that takes place in class (Ewell & Rodgers, 2014). It is reasonable to believe that, if students prepare before class, they are prepared to recall relevant information from assigned readings and have established a foundation for in-class discussions at the more sophisticated cognitive levels of application, analysis, synthesis, and evaluation (McDougall & Granby, 1996).

Several factors can affect the ease of students' class participation. For example, preparation for class is imperative for informed class discussion to occur (Fassinger, 1995). Students should know what specific issues will be discussed in a class period and should study the assigned content on those issues prior to class. Moreover, instructors should have students answer questions in writing over the assigned content prior to coming to class. Some educators have recommended allowing students more time to formulate their ideas before asking them to discuss those ideas in class (Angelo & Cross, 1993; McKinney, 2000). Also, the size of the class and the location of the student's seat in the

room may affect the ease of participation in class discussion (Karp & Yoels, 1976; Morrison & Thomas, 1975). Reticent students might benefit from selecting smaller classes when available and sitting as close to the front and center of the room as possible (Foster et al., 2009).

The lack of preparation for class leads to decreased student accomplishment and concomitant teacher frustration in both lecture- and discussion-based courses. It is all but axiomatic that the less reading a student does in a field of study, the less able the student is to understand the field and to move up Bloom's hierarchy of cognitive skills. Much research also indicates, not surprisingly, that failure to do the out-of-class reading assignments impedes students' ability to participate meaningfully in class discussions (Fernald, 2004).

CLASS PARTICIPATION AND GRADE PERFORMANCE

Hypothesis 2: Class participation positively increases grade performance.

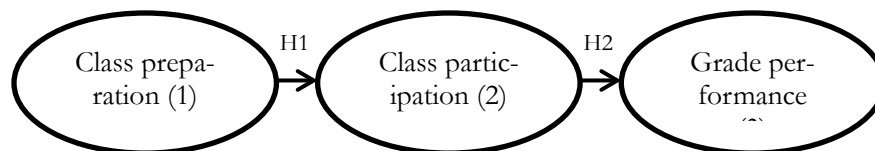
Although one might expect that student participation is a reliable predictor of course performance, minimal research has addressed this issue (Leeming, 2002). Some research points to positive effects of allowing students to discuss possible exam items on future exam performance (Sappington et al., 2002). Other educators have claimed that involving students in class discussion can facilitate their critical thinking (Garside, 1996; Harton, Richardson, Barreras, Rockloff, & Latane, 2002; Jones, 2008).

Instead of self-managed learning, most classes in college are currently centered around the instructor. The limitations of such lecture-centered classes have been pointed out for decades (Biggs & Tang, 2011; Foster et al., 2009; Smith, 1977). First of all, lectures are presented as a monologue. Instructors pass on material that they have developed. Therefore, the students become relatively passive, and metacognitive processes are not easily activated (Bligh, 1972). As Bligh (1972) pointed out a long time ago, there is little proof that lectures are effective in transferring a large amount of knowledge, or that lectures are effective in encouraging students to become devoted to schoolwork.

DISCUSSION

The inverted and flipped –classroom approach is replacing traditional class delivery due to its passive environment of learning. However, to fully get the benefits of this approach class preparation and participation present a link. Through literature review, this paper tries to understand the link between three constructs of class preparation, participation and grade performance. The prime aim of this was to develop the constructs towards improved performance in the flipped class environment. The conceptual model and hypotheses are proposed as shown in Figure 1.

Figure-1. Conceptual model and hypotheses



Key: (1) Ewell & Rodgers, 2014
 (2) Roediger, et al., 2011
 (3) Leeming, 2002; Terpstra, 1979

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