Impact of student's goal orientation in a flipped learning environment

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BACKGROUND

Flipped instruction is a form of blended learning that typically encompasses the use of technology to move instruction and preparation outside the classroom. This facilitates the use of 'in class' time for more participative learning activities. These activities should require students to interact and collaborate to improve both their learning and their learning experience.

Many researchers have highlighted issues of importance to designing learning activities including student behaviour, assessment, student self-efficacy and goal orientation and the importance of dialogue and feedback for learning.

PURPOSE

In this paper we explore these themes in the context of a flipped instruction environment for different types of students: those with a learning mastery orientation, those focussed on grade achievement and a subset of grade achievement students - those who struggled to pass.

APPROACH

Student perceptions of flipped instruction were investigated through survey responses, observations and focus group discussion. In particular, students were asked to explain the impact of the flipped activities on their learning experience including how they approached their studies or managed their time.

OUTCOMES

Students reported liking flipped instruction compared to the more traditional lecture style delivery format. Most students believe that it had a positive impact on their learning experience and promoted them to become more independent and responsible learners. The main finding that emerged from the interviews and focus group was how the student's goal orientation affected their engagement with the learning opportunities provided.

CONCLUSIONS

The authors present a model showing potential pathways for a change in goal orientation prompted by the quality of assessment and learning design. We found evidence to support our theory that a student's orientation can be changed temporarily by the quality of the learning opportunity provided and in particular how it is assessed. We recommend that instructors develop learning activities that challenge students to develop their understanding from multiple perspectives and assessments that require them to apply this understanding in different contexts. Such activities and assessments will act as an initial step in promoting students' adoption of a mastery approach to their learning.

KEYWORDS

Flipped instruction, curriculum development, goal orientation, student experience

Introduction

Flipped instruction is a form of blended learning that provides an opportunity to replace transmission-based lectures with more participative, interactive and collaborative learning opportunities. Preparatory activities are typically undertaken out of class to free in-class time for students to engage with learning activities that require dialogue, collaboration and feedback between peers and instructors. In-class activities then provide a means of engaging in and exploring higher-level learning outcomes and ongoing development of a disciplinary discourse.

Typically instructors focus on their students' cognitive development in relation to the subject material. However, students' learning expectations and their level of metacognitive development mean that many of them are not ready for the responsibility and independence required to engage with flipped instruction, and hence need scaffolding and support to do so.

This paper considers the impact of learning design on a student's goal orientation which affects how they engage with learning activities.

Background

Flipping should not simply be about changing the method of content transmission but rather as an opportunity to significantly improve student learning. Many researchers have highlighted aspects of educational design which characterise good practice. These good practices also apply to the flipped learning environment including the importance of assessment, dialogue and feedback for learning, and the effect of student goal orientation, metacognitive development and self-efficacy.

The importance of assessment on learning has been highlighted by many previous researchers, notably Ramsden (1998) who found that *"...the most significant single influence on students' learning is their perception of assessment"*; and Hinett (1998).who reports that *"the quality of the learning is directly affected by the way students interpret the educational context and assessment demands"*.

The impact of assessment on student learning is strongly linked to feedback as highlighted in Hattie's (1987) meta-analysis that reported that feedback had the strongest single influence on what makes a difference to student achievement. Sadler (1989) argues that for formative assessments to be effective students need to be actively engaged with the feedback on a task, rather than the grade.

In addition to feedback or feed-forward, learning activities should include opportunities for dialogue between the student and other students and between the student and the instructor. Such conversations provide students with an opportunity to develop a language enabling them to articulate, discuss and evaluate their understanding. Hinett's (1998) reports *"...students evaluate their understanding by their ability to talk about the subject or explain it to someone else"* and that *"there appears to be a connection between speech and understanding"*.

In previous studies (Willey & Gardner 2014, Willey, Gardner & Kadi 2014) we found that flipped instruction may require students to take more responsibility for their own learning. This may be reflected in students having to change their approach, regularity, attitude and culture through which they engage in their learning compared to a traditional lecture format. The increased responsibility for and independence of their learning requires them to exercise their self-efficacy. That is their belief in their capacity to organise and carry out the actions required to achieve their objectives (Bandura 1997, 2001).

Students' self-efficacy has been linked to their goal orientation (Svinicki, 2004). Researchers argue that students approach a learning situation with one of two types of goals, either mastery or performance. Mastery oriented students are learning focussed and their attitudes

and behaviour support mastery of the skill/concepts involved. For these students, mistakes are seen as opportunities to learn and they will ask for help as they do not regard this as a sign of weakness (Svinicki 2004). Performance oriented (or grade achievement) students are aiming to be competent enough to achieve the particular grade they are aiming for (whether high distinction, distinction or pass). For these students understanding of material is a means to an end and is not necessarily a requirement, often being satisfied with the capacity to mimic learning in assessable activities. They "*prefer to stay with tasks they know they can do*" (Svinicki 2004) and so they generally avoid situations that may expose what they don't know, meaning they may not ask questions to help their learning. Klein, Noe and Wang (2006) found that "*maximising learning goal orientation appears to be beneficial for all instructional delivery methods but appears to be particularly important in ...blended-learning environments where learners have greater control over when and how learning occurs*", and so this concept is particularly relevant to the flipped learning environment.

The impact of assessment on goal orientation

As well as being linked to self-efficacy, a student's goal orientation will impact on how they engage with a learning opportunity. Figure 1 shows potential pathways of change in goal orientation as a result of the quality of assessment and learning design. Many students are what we regard as focused on grade achievement, that is, they plan their approach to a subject to achieve a certain grade. This might be a high distinction or simply a pass but they do what has to be done to achieve this grade often with little regard to what they have actually learnt. A smaller percentage of students are what we would regard as focused on learning mastery. These students approach a subject to learn as much as possible, they seek to deeply understand the subject material and be able to apply it in different contexts. We suggest that in the long term grade achievement students can be moved towards behaving like mastery students through well designed and scaffolded learning opportunities and in particular appropriate and well-designed assessment. Conversely learning mastery students may behave like grade achievement approach in courses/programs where assessment and learning opportunities are poorly designed. As yet we have no evidence to support these long-term changes as they are difficult to evaluate and would require a complex longitudinal study, however, we have evidence of short term changes. We have found that well-designed learning activities that include appropriate and effective assessment, scaffolding and feedback can motivate a grade achievement student to approach a subject with a mastery focus, while a poorly designed learning opportunity and/or assessment activity may result in a mastery student temporarily focusing on grade achievement.

Previous researchers have highlighted the importance of assessment design including its impact on student behaviour, self-efficacy and goal orientation and the importance of dialogue and feedback to learning. In this paper we explore these themes in the context of a flipped learning environment for three groups of students: those with a learning mastery orientation, those focussed on grade achievement and a subset of grade achievement students - those who struggled to pass.

Our approach

Continuous Communications (stage 6 of 8) is a Telecommunications subject within the Information and Communication Technologies (ICT) Engineering degree at the University of Technology, Sydney (UTS). In autumn semester 2014 the first author taught this subject for the second time. The subject content was delivered through a combination of a series of short videos (21 in total, approximately 5 minutes in length, 15 specific content, 6 in the form of online demonstrations, made on the instructor's PC using inexpensive software and a $95AUD document camera), notes, inquiry based learning activities, tutorial exercises and a series of formative individual and collaborative assessments. The videos intentionally did not cover all of the content but rather targeted the more difficult and/or threshold concepts within

the subject. The subject outline clearly identified the required learning outcomes and competency objectives of the subject. In addition, students were expected to consult one or more of the many textbooks available on the subject material.
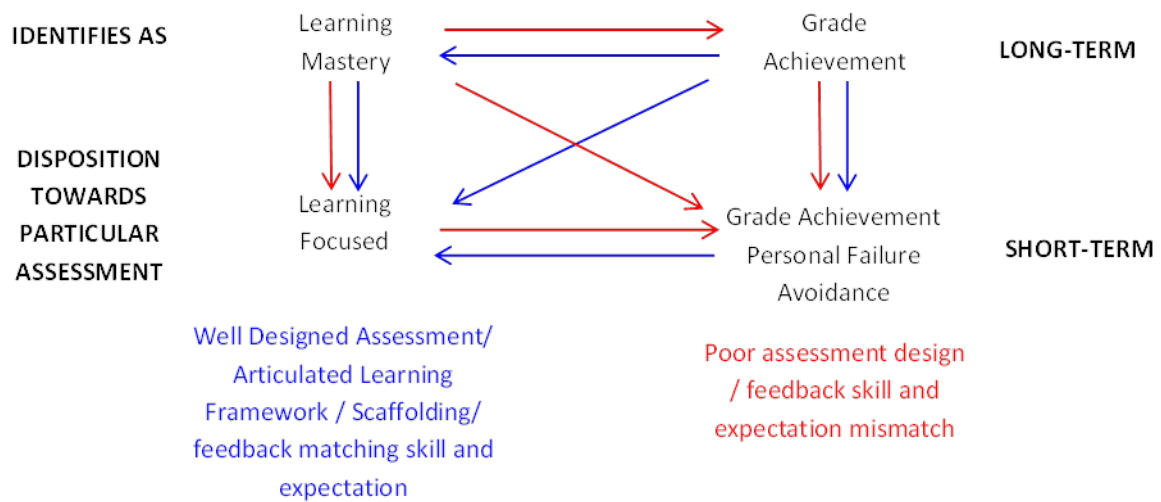

Figure 1: Pathways of change in goal orientation

Students were expected to undertake out of class preparation including a combination of readings, watching videos, individual quizzes and enquiry based laboratory preparation. The in-class participative activities included collaborative multiple attempt quizzes, enquiry based discovery activities, tutorial problem solving and discussions, laboratories and demonstrations.

The resources, instruction and in-class exercises explicitly introduced multiple perspectives in addressing the learning outcomes to assist students to overcome learning thresholds, and to develop professional identity and expertise while supporting them to transition from novice towards expert. An expert views a problem from multiple perspectives considering how best to solve it, evaluates their solution, identifies sensitivities and weaknesses and can apply these perspectives in different contexts. In contrast a novice often uses only one approach or perspective to solve a problem. Multiple perspectives help students to develop a complex knowledge base in relation to the subject area (Lasry, Mazur & Watkins, 2008) and also make visible aspects of the phenomenon/problem that may not be obvious when using a single perspective. The learning design included numerous opportunities for students to practice and evaluate the impact of applying multiple perspectives to situations and problems (Willey & Gardner 2014).

The class was small, having only 21 students and, although senior undergraduate students, all were undertaking flipped instruction for the first time.

Our study focuses on investigating the impact of flipped instruction on the learning experience of students from each of the targeted cohorts. After institutional ethics approval, student interactions were captured through a series of activities including:

- observations of students,
- an online survey consisting of a number of Likert scale multiple-choice and free response questions, (this paper focuses on understanding students' reactions and behaviour through a qualitative analysis the quantitative results are not generally reported in this paper),
- a series of individual interviews with mastery and grade achievement students, and
- a focus group of students who struggled to pass the subject (note: no students from this category volunteered for an individual interview).

Observations of students were made as they were undertaking in-class activities paying particular attention to their apparent level of preparation, their interaction with the instructor and other students, and their approach to the learning required by the assessment tasks. The interviews and focus group, held after all assessment tasks were complete, were carried out by the co-author not responsible for the subject to reduce the perceived power differential between researcher and student. The line of questioning in the interviews and the focus group were similar, both asking students to describe how they went about learning in various subjects, and how they judge when they 'know enough'. The focus group and interviews were recorded and transcribed. As this research is in an exploratory phase, the resulting transcriptions were coded for the themes that emerged from the discussions rather than specific pre-identified themes.

Ten of the 21 students in the subject volunteered to complete the online survey. Three students were interviewed one each identified as mastery, grade achievement , and a student who struggled with flipped learning. Three students who had difficulty passing the assessment material participated in a focus group.

Student comments obtained from the interviews or focus groups identify the student's goal orientation. The goal orientation of students who completed the survey was not generally determined and hence the source of these comments is not identified in the following sections of the paper.

Results and discussion

Impact of flipped instruction

In the survey 9 of the 10 participants agree that they liked the flipped instruction approach more than the traditional lecture style. When asked about the impact of flipped instruction on their learning experience, most students agreed that it was positive. Their reasons were that it prompted them to work more consistently, provided ongoing evaluation of their learning, afforded opportunities to receive help in class and the flexibility to engage with material in their own time:

> The classes *"focused on what I didn't understand as opposed to pushing out volumes of information. At home I could work out what I needed help with and in class that was addressed".*

> *"I found it helpful doing the collaborative exercises with other students - I think everyone is more likely to ask questions (not as embarrassing as asking the lecturer during his lecture) and you learn a lot from being able to explain something to others and vice versa".*

> *"It allowed me to identify what I need help with and knowing that I can get that specific help in class has been a positive thing".*

Impact on goal orientation on engagement with learning

Characteristics of student engagement with the learning opportunities afforded by the subject design emerged from the interviews and focus group. These aspects included specific tasks they undertook to learn the material as well as the level of responsibility they took for their learning and how this related to their perception of the major assessment task.

The mastery student described an approach to learning that included a process of consistent and regular study, feedback and review. They characterised their approach to learning as:

> *"I go to the lecture, go home and then watch those videos three or four times … because it takes me awhile for it to register... and then I'd start working on the questions, and read the lectures and stuff … I had to go and talk about it (the questions) and sometimes I was wrong, sometimes I was right, and he (the lecturer) explained why I was right and why I was wrong … I learned it to the point where I can explain it.   Then it just clicks. So because of that, the exam … questions aren't hard. It's not something you don't know".*

In contrast students who just passed or failed at their first attempt to satisfactorily demonstrate the subject learning outcomes reported two consistent issues. The first and most common related to not spending enough time on task, including putting off study until the last minute as most of the flipped activities were formative in nature:

> *"I kind of waited until the end to address* what I needed to learn... *I should have addressed it a lot earlier and I should have also done more consistent study throughout the semester"* (focus group just pass student);

> [the lecturer] *"was holding drop in sessions where students could come in and chat with him. I never really made use of them. I think I really should have done that"* (focus group just pass student).

When asked about their priorities the 'struggling to pass' students agreed to a preference for focusing on summative assignments in other subjects at the expense of the formative flipped activities:

> *"Yeah, definitely, because that's immediate and there are marks associated with that whereas, you know, the (Continuous Communications) exam, I thought oh it's five weeks away. There's time to study for this"*;

> *I left everything to the last minute because marks were not involved throughout most of the semester (apart from labs)... I think flipped learning would work where you have really motivated students with a lot of self-discipline;*

> *I wish that I had worked more consistently, however as most of the marks are earned in the threshold and final exam, I haven't felt pressed to manage my study time very well (grade achievement student).*

Other issues commonly raised by the 'struggling to pass' students related to their anticipation of having access to the type of resources they expected and typically used, and their need for specific direction on what to study. These students expressed disappointment and felt it was unfair that they didn't receive clearer guidance as to what exactly was in the final exam, going as far to say that they should have received worked solutions that were similar to the exam problems as this supported their method of learning:

> *"I need to know what the final exam is going to be like, what kind of questions, I have to know that first. If it's theory I need to really, really read more - lots of information about the course. If it's calculation then I just do more sample questions"* ('struggling to pass' student);

> *"In the final exam he should have told us what questions it would be like, what you have to focus on"* ('struggling to pass' student);

> *"They're too many different" resources ...which one we can focus on, we don't know. That's why we get a problem"* ('struggling to pass' student).

While all students undertook the same flipped learning class there were differences between the mastery, and the 'struggling to pass' grade achievement students as to how they perceived the opportunity provided:

> *"I was motivated to work hard on my understanding…I realise when I understand it, it actually sticks more, rather than just memorising the words and stuff"* (mastery student);

> *"We work on a lot of things,… it's too much. We don't know what we concentrate and focus on. So that's why when we read a lot and then after that we forgot the solution and the lecture and the lecture online"* ('struggling to pass' student);

> *"Even if we understand (the theory) but we don't know how to apply it … He (lecturer) helps us but with the real one (exam) we don't know which one we should use as a formula"* ('struggling to pass' student).

In summary we found that mastery students worked more consistently and regularly, enthusiastically engaging in both the summative and formative activities. They took responsibility for not only their own learning but managing their time and found their own additional resources. They sought and received regular feedback from both their peers and

the lecturer. In contrast the students who struggled to pass spent a lot less time on task, focused mainly on summative assessments, took less responsibility for their own learning expressing an opinion that their problems were often not of their own making but rather because they hadn't been provided the resources they require. They sought more specific guidance on exactly what to learn and learnt mainly through practising problems but they found it difficult to translate the concepts to different contexts.

In addition, mastery students reported taking a more surface approach to learning and becoming more grade achievement oriented in subjects where one could do well in the assessments by simply practising and with only slight variations regurgitating the tutorial problems, often from memory with limited understanding:

> *"...like with the exam* (in another subject not the focus of this study) *it was just not really using what you learned; it's just basically the same as the tutorial questions, which isn't bad - like, it's good to pass a subject, but I can't really say I learned much from it, to be honest."* (mastery student)

> *"... too many subjects it's too easy to get by, by just reading the lecture notes which means you don't really understand it but you can give the lecturers what they are looking for in the exam."* (mastery student)

This also tended to occur in subjects that were poorly designed or regarded by the students as uninteresting. Conversely competent grade achievement students would move towards a learning mastery approach in subjects they found interesting, were well designed and had assessment tasks that required them to demonstrate substantial non-memory activities requiring application, judgement and interpretation.

In a parallel study there was evidence to suggest that designing learning activities that introduced multiple perspectives promoted learning mastery in students (Willey & Gardner 2014). Students reported that multiple perspectives helped them to develop a deeper understanding of subject concepts, to more easily understand difficult and / or non-intuitive concepts and that this motivated them to learn, commenting that:

> *"instead of just learning to solve problems the approach* (multiple perspectives) *helped me develop a deeper understanding of the subject material"*

> Sometimes I *"find it difficult to translate the maths into an understanding of what is actually going on, different perspectives allowed me to gain a rounder understanding of problems, which made them easier to understand".*

> *"solving problems using multiple perspectives gave me a confidence boost";*

However, improved subject design appeared to have less impact on promoting changes in the way grade achievement students who were struggling to pass, approached their learning. We suggest that this most probably relates to the tendency of these students to be less flexible in their approach to learning and their expectation that their instructor, not them, is responsible for meeting their learning needs. These results consolidate previous findings supporting the goal orientation framework described in Figure 1.

Findings & recommendations

The study found that students overwhelmingly liked flipped instruction and the more interactive learning opportunities it provides. However, some students lacked the skills and confidence in their judgement to independently study from their own or even provided resources, many of these considering that material should first be discussed in class.

This study also reinforced that learning involves a social partnership between students and academics and both parties have to play their part for successful learning to occur. This is arguably more so in flipped learning environments. Academics are responsible for designing a subject to support student learning, but learning won't occur if students don't take advantage of the opportunity provided.

While this partnership exists in subjects designed using a traditional lecture format, it becomes more visible in a flipped environment. In a traditional lecture format students can miss lectures and /or not keep up with the material but this has little if any impact on the lecture delivery – the academic can typically still proceed as planned. In flipped design if students haven't prepared it becomes immediately apparent during the in-class learning activity. This puts the academic in the position of having to decide whether to give a short lecture to enable students to participate in the activities. However, doing so rewards the students who haven't prepared and punishes those that have, providing no incentive for students to prepare in the future. A common response of many instructors to poor student motivation is to allocate marks for lecture preparation and/or participation as suggested by some of the 'struggled to pass' and other grade achievement students:

> *I think that tutorials and a 1% mark for attempting tutorial questions would motivate students to study over the whole semester... I think most students will not do it because there are no marks involved. There's little motivation ('struggled to pass' student);*

> *I think I would have tried a lot harder to complete the quizzes and learn the material well if they were worth marks; even just one mark per quiz would have added up to a somewhat significant portion of the course. I think that would greatly improve participation rates as well (grade achievement student).*

However, we agree with Sadler (2010) who would regard this as invalid assessment since pre-lecture material is typically not at the performance level required to satisfactorily demonstrate the subject learning outcomes.

While students may need more scaffolding to promote engagement in formative activities, these activities encourage a focus on learning by providing an opportunity for students to practise and get it 'wrong' in a safe environment without penalty. We suggest scaffolding should both clearly explain and demonstrate to students how to use formative activities to identify their learning gaps and then have them addressed by their peers and the instructor within the in-class activities that flipped learning facilitates. We have found that providing regular opportunities for students to not only evaluate their learning but to appreciate how much they have learnt (for example, by providing opportunities to compare early understandings to those achieved later in the semester) can provide both a sense of achievement and promote learning motivation.

Conclusions

Flipped learning should not be seen as a means of simply changing information transmission from face-to-face to online but rather as an opportunity to free up class time to allow participative learning opportunities. We find that although it has significant potential to improve learning outcomes, it does require commitment, at least initially, of additional time, resources and skill development on the part of academics and a change in learning culture for many students. Supporting scaffolding should be used to assist students to develop the skills and attitudes required to make the most of flipped instruction.

We also found evidence to support our theory that a student's orientation can be changed temporarily by the quality of the learning opportunity provided and in particular how it is assessed. We find that developing learning activities that challenge students to develop their understanding from multiple perspectives and assessments that require them to apply this understanding in different contexts are beneficial steps in promoting students to adopt a learning mastery approach.

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