

The impact of struggling students' self-efficacy, agency and horizons for action on their learning in a flipped environment.

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INTRODUCTION

Flipped instruction is a form of blended learning that moves significant instruction and preparation outside the classroom to facilitate 'in class' time to be used for more participative learning activities. These activities should provide opportunities for students to interact and collaborate to improve their learning, their learning experience and ideally their capacity to learn. These in-class blended learning activities provide opportunities for instructors to provide more dynamic and specific feedback to students and to receive feedback from students about how they learn, the effectiveness of the activity and what they do and don't yet understand.

Students report liking flipped instruction compared to the more traditional lecture style delivery format. Many students commented that while it often challenged their approaches to learning, it had a positive impact on their learning experience and promoted them to become more independent and responsible learners [1, 2, 3].

However, some students struggle to succeed in flipped learning environments. An alternate pathway was provided for these students. While this pathway was extremely effective in assisting students to satisfactorily demonstrate the subject learning outcomes, we questioned whether it helped move students, who were often dependent learners, towards self-actualisation.

This paper reports our findings from our preliminary investigation of the learning behaviours of students undertaking the alternate pathway. Examination of these findings led us to a data-driven theorisation of the barriers that these students have

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to learning in a flipped environment and consequently to the need to change our approach to promote long-term benefits from these alternate pathway activities.

1. BACKGROUND

For many students their flipped instruction experience leads to the development of new skills, improving their capacity to learn. These skills are subsequently utilised in their future learning. For example, after an initial flipped instruction experience students reported forming and working in collaborative study groups in subjects that used a more traditional transmission-based learning environment and being better able to independently assess and judge their own understanding and learning beyond that indicated by the grade they received. While this is hardly surprising it does highlight the opportunities flipped instruction provides particularly when it incorporates assessment activities that give students some autonomy in how they demonstrate their competence. The freeing up of class time, inherent in flipped learning design, provides the opportunity to introduce activities that enable students to practice and develop their judgement, innovation, creativity and capacity to learn and/or to address more complex technical problems. Such activities broaden their available perspectives, experiences and horizons for action allowing access to various options to address their learning and professional development.

Despite the positives, even with highly skilled instructors and a well-planned learning experience, some students find it difficult to adapt to the flipped instruction environment. The reasons for this are varied including resistance to change and dependent learners wanting to be told what to do rather than taking responsibility for their own learning. Although the overall indications from previously reported studies [1,2,3] found a predominantly positive response to flipped learning, some students made strong negative comments demonstrating how the flipped environment did not meet their expectations of how learning should be organised. These attitudes are in line with findings from other researchers in engineering education such as Bishop and Verleger [4] who reviewed twenty-four studies of flipped learning and found that: "*Opinions tended to be positive, but there were invariably a few students who strongly disliked the change*" (p.9). These comments have recurring references to 'paying' to being 'taught' in lectures despite the literature finding that lectures are not effective for learning [5,6,7]. Beetham and White [8] similarly found some students dissatisfied with their flipped learning experience due to their attitudes and expectations of what constitutes "*legitimate learning practice*".

While there is strong evidence that the alternate pathway activities significantly assisted students to demonstrate the subject learning outcomes we reflect that their success might be attributed to the fact that these activities compensated for a lack of students' self-efficacy, agency and horizons for action and did not necessarily improve their approach to and/or capacity to learn independently nor move them towards being more self-actualised learners.

1.1. Agency, self-efficacy and horizons for action

Agency is having a sense of power, and the ability to take actions that the individual believes will contribute to their progress towards a particular goal or intention. While agency is a trait of the individual, it is constructed in a social context [9,10].

According to Emirbayer and Mische [11], the effect of differing social contexts account for variability and change in an individual's ability to take action. This suggests that an individual can display strong agency in some areas of their life and

not in others – a student can demonstrate high levels of agency during a soccer game for example but not in regards to their learning. Or arguably even in one learning context but not another.

O'Meara and Campbell [10] found that agency was strongly linked to a person's expectations of themselves – in applying this concept to students this means that how a student sees themselves as a learner will affect their sense of agency with respect to that learning. Bandura [12] states that in the modern higher education environment students are "*agents of their own learning, not just recipients of information*" and that this "*shift in the locus of initiative requires a major reorientation in students' conception of education*" (p.176).

Marshall [9] lists various aspects of agency:

- (1) the human capacity to make a choice, that is, to be intentional;
- (2) the resources within the individual or at the command of the individual that can be brought to bear in intentional or agentic behaviour;
- (3) behaviour of individuals that reflects intention; and
- (4) the social and physical structuring of choices.

The first aspect relates to an individual's ability to make informed, rational decisions and make realistic short and long term goals and is thus a developmental characteristic or capacity. The second point refers to both the personal characteristics of the individual such as intelligence, learned skills, knowledge, or strength, and the resources that they can activate such as wealth or social networks. The third aspect relates to action and the fourth relates to the "*structure of opportunities that is within the range of action of the actor*" (p.12). This aspect is also referred to in [13] and [14] as an individual's horizons for action. These researchers [9, 13, 14] comment that this concept is not a static state for any individual but a changeable one. Bandura [12] also describes horizons for action, without actually using that terminology, and links horizons for action to self-efficacy:

"People who develop their competencies, self-regulatory skills, and enabling beliefs in their efficacy can generate a wider array of options that expand their freedom of action, and are more successful in realising desired futures than those with less developed agentic resources" (p.165).

He goes on to say that agency is not just linked to efficacy but that it is the

"...foundation of human agency. Unless people believe they can produce desired effects by their actions, they have little incentive to act or persevere in the face of difficulties." (p.170).

Hence students of low efficacy give up quickly in the face of difficulties compared to those of high efficacy who are confident that they can overcome difficulties, so persevere.

2. METHOD

Students who were previously unsuccessful (failed) in a large flipped class in a first year engineering mechanics unit were invited to undertake an alternate learning pathway through enrolling in an intensive block mode held over summer. A major difference between the block mode and the standard mode offering was that there were 25 students in the class rather than 200, allowing the class to be held in a room

where students could sit in groups around tables rather than in a large lecture theatre.

The first activity for the students was to reattempt the previous semester's final exam – first individually and then collaboratively in groups at each table. At the conclusion of this exercise students were asked to identify the questions they had difficulty with allowing the class to create a list of topics that they particularly needed to work on in order to meet the subject learning outcomes. This list of topics became the syllabus for the block mode subject.

Subsequent sessions were run in line with the collaborative learning activity framework shown in Figure 1 starting with individual work on a problem/s then groups collaboratively solving the problem/s. While the groups were working together the instructor moved from table to table answering questions, providing feedback or providing variation in the problem, depending on each group's progress.

Because of the short timeframe (8 weeks) of the summer session there were no assignments and the subject result depended on the student's performance in firstly a threshold exam (with the 'pass' level set at 75%) [15] and a subsequent final exam.

The significant improvement from students who had previously failed the subject prompted us to investigate why they were more successful in the alternate flipped instruction environment than the flipped instruction environment used in the original class, especially given that the online resources were largely the same.

Student perceptions of flipped instruction, their learning and their approach to learning were investigated through survey responses, observations, examination of assessment scripts and focus group discussions. 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 and any differences between when they undertook these activities in the standard mode compared to the alternate block mode.

In line with ethical practice the surveys and focus groups were conducted by a researcher not involved in the subject with the instructor not having access to the student responses until after the subject grades had been published.

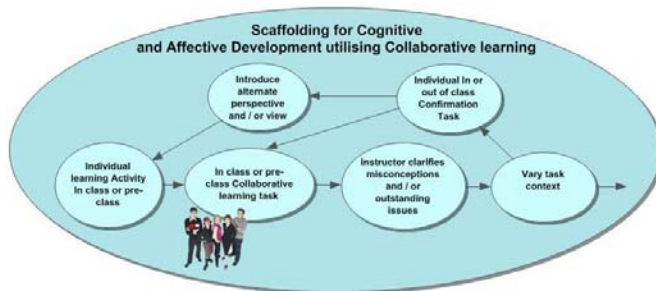


Fig. 1 Collaborative Learning Activity Framework (Original version [16])

3. FINDINGS

Most of the students in the alternate block mode reported a preference for the traditional style lectures and a dislike of large flipped classes. Their comments suggested a dependent learning style:

"I'd say that I like old fashioned way, if you can say that, with the lecturer just pumping out information, showing you the steps and then you're doing questions on your own but looking back as a guidance type of thing"

"I'm so used to walking into a lecture and just the lecturer throwing up questions on the board and them doing it and us following their steps instead of us going in there and showing (the instructor) what we did"

They thought that it was unfair or at the least not in line with their expectations for learning to be required to prepare or attempt material before it was covered in class:

"You should not be expected to attempt questions after watching a video before you'd actually done a similar question in class".

Most of these students reported that they didn't do the pre-work before class in the original flipped instruction offering. One student commenting *"I didn't because there was nothing forcing me to do it beforehand"* and another said *"yeah, like I did the first week and then when you get to class and (the lecturer says) like it's not compulsory then you like stuff that"*. Furthermore, all the students admitted to spending *"not a lot of time"* on task studying when initially undertaking the subject compared to when they undertook the alternate block mode class.

These comments suggest these students require extrinsic motivation (an expectation of marks in this instance) to achieve the learning goals. Self-determination theory [17] describes extrinsic and intrinsic motivation and explains that autonomy, competency and relatedness are required to induce a high level of intrinsic motivation. The comments students made relating to their motivation suggests that self-determination theory may provide valuable insights as suggested by Abeysekera & Dawson [18] in our future studies of flipped learning.

Most of the students in this study reported a lack of perseverance in the standard mode delivery of the subject. They reported that they would typically: *"give up"*; *"yeah, just leave it"*; *"if you watch the videos and you don't understand one part of them you kind of just stop watching"* when difficulties were encountered. This propensity to give up illustrates a lack of self-efficacy. Their helplessness extended to not being able to bring their questions to the next week's class or tutorial as: *"you're on to the next one[topic] where you've got more questions and it just keeps building up"*.

They also reported a reliance on procedural learning as exemplified by their description of their preferred method of learning being to follow steps used in example methods so they could go back and check that they were taking the right steps: *"Try and find a previous student and get their examples of what there've done because sometimes that works better if you just see it as a handout for you on a piece of paper instead of going there and like you try and do the question again and get them wrong about five times and just giving up"*.

When asked why they couldn't take a more active approach in deciding how they approached the subject and their learning, student comments demonstrated a lack of agency and limits to their horizons for action. They felt a lack of control over their learning and/or an inability to take responsibility for it:

"it's out of our control really. It's the way the lecturer wants to go on about it. Like this [the alternate class approach] is perfect but then we go back to let's say Autumn

semester [original offering] and then the flipped learning will be back into place and then will be like, what's happening."

"It is difficult because you can only go on what the lecturer gives you, what materials, what resources they give you "

A lack of agency is also demonstrated in their arguments as to why they couldn't source other resources themselves. Most students commented that they would not know whether self sourced resources were useful or correct. Others commented that unless it used the same method or technique they couldn't follow the steps to solve other problems:

"Well say if you - say if they do give like problems and they show you how to do it and you do it another method, you can't really compare the two. You can't see where you've gone off track and there's no - yeah and then if you bring it to class, say the lecturer will be like, that's not the way I've shown you how to do it. I don't understand what you've written here myself, that's a whole different way of doing it".

"Like you can go out and find your own material whatever, but how would you know whether it's relevant to what you're doing in class?"

"I like to use youtube a lot because I like seeing the way people work out the problem and sometimes it's just different to the way we do it. It just doesn't make sense. Like if you look at an American youtube video they do stuff completely different to what we do here". "They approach it differently. I know it shouldn't matter like the pounds, the feet, the inches and then they're using other ways. It's like what's going on?"

Preference for the alternate flipped class

Students commented that they preferred the alternate block mode sessions to the large cohort flipped classroom as the environment meant they felt more confident to ask questions or seek help without feeling embarrassed or silly. It also meant that students felt there was more alignment between their goals and the goals of the other students in the alternate session, that is that there was a form of social relatedness [17]:

"we're all here for the same reason - because we failed the subject. So we all have similar interests, we want to pass the subject So everyone is like minded at the moment. Whereas in a semester at the start of the semester, everyone is kind of going in with the same thought like I would - just got to get through this...."

They also found the smaller cohort meant they received more specific and regular feedback from the instructor:

" if I have a question that I don't know, even just a small question like which way does the sign have to go-like at home I would rack my brain for an hour trying to work it out. Probably not work it out and let it go. Whereas here I just walked straight up to [the instructor], get it sorted like that."

There was general agreement that the students spent significantly more time on task studying in the alternate block mode class:

"you feel like if you don't do anything you'll just get caught out"

"Yeah I think the fact that these classes are smaller and you are kind of forced to actually do the work because [the instructor] comes around as opposed to the

lectures when they're a lot bigger and you can sit with your friends you just talk and you don't do any work."

They also reported that three + two (five total) hour sessions on the one day in the alternate class allowed them to understand the material at a deeper level as they were able to get feedback and build on their understanding rather than leaving it for a whole week or until the next tutorial.

As reported earlier nearly all the students who undertook the alternate block mode described their preferred learning method as following steps to solve problems, a practice they employed in the original large flipped class. In contrast, when undertaking the alternate block mode sessions their approach was different: *"We're not learning the method, like right now - maybe it's because we just did the subject and we're doing it again but I think we've learnt, we're not learning the method anymore, we're learning why and that makes us understand it."*

Students commented that even if the instructor was available every day in the learning precinct (dedicated space for academics to engage with students) to ask questions they would be unlikely to take the opportunity to do so because *"there may be lots of other people there wanting to ask questions as well"*. Whereas in the alternate class *"there is someone that is going to be around and help you and you're working with everybody - it's easier"*.

This lack of agency is further evident in the discussion presented below regarding the standard mode tutorials and how they couldn't use them in the same way as they were using the alternate block mode classes:

Student: *"The thing I found with the (original flipped classroom) tutorials was, I went there and they just say do your work. Instead of like showing us how to do the tutorial questions. So I'd go there and be like I've got no idea what I'm doing here. I'd like some guidance as to how to do it. Whereas they just wanted to have tutors there who answered your questions about the problem but if you had no idea what the problem was you're kind of stuck. Because there was no guidance as to how to do the questions"*.

Facilitator: *"that's one of the features of flipped learning is that ideally you're trying to find out what you understand yourself first and then you ask a question. So was it hard for you to just say then, look I don't get this at all? I don't know where to start"*.

Student: *"Yeah, pretty much"*.

Facilitator: *"Why was that difficult? Was it hard for you to say it or when you told them didn't you get any assistance or any help"?*

Student: *"Because there's 30 students in a class. You can't really get them on their own and everybody's doing their own individual questions. You can't really just focus on that one question that you want the tutor to show you"*.

During the focus group there was a lot of discussions about why the group work activities worked better in the alternate block mode class than in the initial large flipped classroom. There was consensus amongst these students that working in groups within the large classroom doesn't help because:

“everyone was clueless because there was no set answer. There was no way of doing it. It was just like here you go”.

“Like everyone has no idea anyway”

In contrast in the alternate block mode format students reported that learning was *“definitely more effective in the small groups”*,

“yeah, because you get those questions like-when I first started last semester I came in and they had this equation on the board. It honestly looked like a different language to me and I never asked anyone because it was just like too big a group whereas now if you don’t know it, she’ll [the instructor] come around and she’ll see that you’re got no work and either tell you what you don’t know or you can ask her what you don’t know”.

“Now you’re forced to actually meet in a group. Whereas opposed to when you were doing the subject by yourself or like in normal semesters, like even if you do form a group, the chances of you actually doing work are like slim to none because you’re just too busy having a good time with your friends, just talking. You get distracted...”.

4. OUTCOMES

Most of the students who undertook the alternate block mode activities described a dependent style of learning and in regard to their learning, at least within the large flipped classroom, low self-efficacy, agency and a limited horizon for action. These factors resulted in them reporting that they were often unable to persevere to complete pre-class work, which meant they fell behind and were unable to actively participate in the in-class activities within a large first-year flipped class.

Reflection on notes from the observational studies and examination of the focus group transcripts suggest that the alternate block mode activities may have been successful in part because their design compensated for underdevelopment in the participants’ self-efficacy and agency that had effectively limited their horizons for action and help-seeking behaviours. In particular, the smaller cohort and nature of the activities facilitated more regular and specific feedback much of which was unsolicited as it was built into the activities. Hence a lack of self-efficacy that would have otherwise meant students would have found it difficult to persevere when they encountered difficulties was not evident as the instructor provided near immediate feedback and support to address learning gaps when students were undertaking their in-class activities. Similarly, because the instructor dropped in on the collaborative activities asking questions and providing feedback, students didn’t need to exercise their own agency in working out how to overcome obstacles or address a problem. The fact that these alternate block mode activities were specifically designed to assist students to overcome learning obstacles meant that numerous options were always available within their horizons for action.

Hence while there is no doubt that the alternate block mode activities assisted students to learn, our study suggests that at least for some struggling students they may have done little to develop their self-efficacy, agency and capacity to expand their horizons for action, these being the attributes these students were unable to access impeding their participation and success in the original flipped class offering. There was virtually no evidence in the focus groups of students understanding what they had done differently in their alternate block mode class learning to suggest they would be able to make changes to their approach to learning in future subjects. That

is, as opposed to being aware that they had done their preparation, spent more time on task, persisted in the face of difficulties and sought regular feedback, they attributed their learning success to be largely a function of the instructional design rather than something that was within their control. This suggests that they will likely struggle again in future subjects that utilise large flipped classrooms.

As a result of this research in considering our subject design for large (> 300 students) first year classes we intend to adopt a “*hybrid flip*” where students have access to a one-hour lecture supported by 2 to 3 hours of tutorial. The flipped approach will still be evident through online instructional support, an expectation of out of class preparation combined with small size tutorials (30 students) incorporating participative and collaborative activities. The intention of the one-hour lecture is to provide instruction support and scaffolding to help students make connections and successfully use the resources and opportunities to learn provided. For example, this semester in one class ‘lecture’ sessions started with students recalling the important points in that week’s online resources and co-constructing with the instructor a summary document for that topic. In addition, as part of their lectures and tutorials students will be introduced to learning theories, affective attributes and be asked to self-assess, plan opportunities to develop and evaluate their self-efficacy, agency and capacity to change their horizons for action in regard to both their learning and professional development. The intention being for students to have access to different perspectives to evaluate/reflect and take action in developing their skills and capacity to become more self-actualised learners. It is hoped that this will open up learning pathways for those students who feel unsupported and disengaged in large class flipped instruction.

This study has also pointed to likely benefits in exploring these problems through self-determination theory to capture the impact of the differing social context and relatedness between the large and the small alternate block mode flipped classrooms.

5. RECOMMENDATIONS & CONCLUSIONS

Some students have insufficiently developed self-efficacy and agency to be able to adapt in particular to large class flipped instruction. This underdevelopment limits their horizons for action in addressing things they don’t understand and/or resolving difficulties and problems.

Universities should ensure that students become familiar with learning/motivation theories and concepts such as self-efficacy, agency and horizons for action early in their studies. Additionally, curriculum design needs to be refined to promote students utilising these perspectives to evaluate, plan improvements and monitor their learning with the aim of becoming self-actualised lifelong learners.

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