4.2 Students Engagement, Self-regulation, Metacognition and Collaborative Teams

Findings

✓ **Just-in-time teaching (JITT):** The study used the pedagogical foundations (JITT) and PowerPoint pedagogy to enhance students’ engagement. The study developed an outline of three steps (see Figure 2.) where these two approaches are combined. The study’s findings suggest that “the combination of pre-lecture PowerPoint preparation by students with the help of lecture modules and then interactive lectures has been positively received by the students, and it is seen as positive for their learning.” (p.160). Contrastingly, one of the limitations of this approach was the policies of the university where the study took place. The policies did not allow faculty members to have compulsory assistance. As a result, students tend not to assist the lecture once they prepared and submitted the pre-lecture PowerPoint, most of the time. A reason for this is that they considered they had completed the content with it the pre-lecture in their home. However, a benefit of these approaches is that allows the teacher to identify misconceptions and address them in the lecture (Wanner, 2015).

✓ **Collaborative teams-Heedful interrelating (HI):** “Heedful Interrelating is a construct that attempts to explain the processes occurring when group members work together toward common goals” (Daniel, 2017, p. 200). The study focuses on explore the efficacy of HI framework for team members, it can monitor and reflect on how they interact with other members. The results indicated that HI framework is beneficial for students since it gives a structure to report the behaviors that are expected while working in group work (Daniel, 2017).

✓ **Virtual Learning Environments (VLEs) and continued e-assessments:** The study found that the engagement is increased with the use VLEs in classrooms with a continuous assessment. One of the reasons given by the students in this increase of engagement is the continue evaluation encourages them to check and read their notes in every test (Holmes, 2018).

✓ **Flipped Classroom:** “Inverting the classroom means that events that have traditionally taken place inside the classroom now take place outside the classroom and vice versa. The use of learning technologies, particularly multimedia, provides new opportunities for students to learn, opportunities that are not possible with other media.” (Lage, Platt and Treglia, 2000, p. 32).

- The study found that students’ perception of the flipped classroom was that it provided them more time to ask their instructor questions related to the course, as well as students felt more confident with this teaching approach (Ogden, 2015).

- While some studies might show benefit for the flipped classroom, other research suggest that sometimes transitioning from traditional to flipped classroom is difficult for students. Flipped classroom requires students to have more responsibility and agency to participate actively in their education. Senior students who have not had experience with this format could have more difficulties. For instance, blended, hybrid or “half-flipped” methods can provide balance in students and even educators who are not ready for the transition (Burke & Fedorek, 2017).
**Situated Learning:**

- The Matrix classroom (Roberts, & Sayer, 2017): This approach enhances real-life learning through re-contextualizing abstract concepts, as well as focusing on students’ knowledge in the classroom activities. This approach also contributes to create learning environments with temporal community of practice. The matrix classroom has two specific stages:
  
  - Stage 1: Setting specialist groups- In this stage the instructor selects 4 to 6 themes that capture topics for the module, and those that are easy to understand for students. Ideally, the themes will evenly split into groups of students, who are denominated “specialist” for that topic in the learning environment (see Figure 9).
  
  - Stage 2: Cross-cutting assessment teams- In this stage each group select one or two students that will form an assessment team. Others’ teams might have a different task to do in a general perspective such as advice other teams in their projects (see Figure 10).

**Case-Based Learning:**

- Case-based learning combined with teamwork activities can promote higher- order thinking skills. This study reports the results from using real business problems that were used to match the contents from the class. The students read the case study before class, once they are in the class they shared their results and analysis with other teams. This allow students to have different perspectives on the problem and solution. The study results suggested that students had a better understanding of complex theories and link them correctly allowing them to see the relevance within the field (Nkhoma, Lam, Sriratanaviriyakul, Richardson, Kam, & Lau, 2017).

- Case-based learning enables students to apply their knowledge in professional practice and can potentially enhance critical thinking skills. The case-based learning should be intentional planned to enhance critical thinking if this is the case. Contrastingly, if the case-based learning lack of intentionally, it will only enhance learning rather than critical thinking (Harman et al, 2015).

**Anchored Instruction:** It is the creation of problems within a context that allow students to observe conditions were the concept knowledge is used. The anchored concept was originally from Vanderbilt University and developed seven principles to take into account for developing anchored instructions (Love, 2004):

- **Choosing an appropriate anchor:** For selecting what the best activities for anchoring are, it is important to have established the goal for the instruction as well as identify the student’s age and level target.

- **Developing shared expertise around the anchor:** Allowing students to view segments of the anchor section (video) can help to create awareness of the complexity in the information and concepts. Creating activities that engage discussion will help students to take responsibility for they own learning gradually.

- **Expanding the anchor:** The use of other anchors might be needed when teachers cannot give the students all necessary information, and even more if the first anchor does not cover all the learning outcomes. This anchor refers to additional videos that assist the comprehension of the material.
- **Using knowledge as a tool**: It is important to develop learning environment that encourage students to use and apply their knowledge. Finding relationships among concepts becomes necessary for helping students to use their knowledge.

- **Teaching with the anchor (video)**: Instructors required to refer the conceptual knowledge for the class by using the anchor and helping students to increase their ability to use the video (anchor) targeting their learning outcomes.

- **Merging the anchor**: The anchor should be linked to activities that use writing, reading and in particular literacy-related skills.

- **Allowing student exploration**: “Giving students access to, and opportunities to explore, the anchor video helps them develop a sense of expertise” (Love, 2004, p. 303).

✓ **GAMES: Pathway to self-regulation (Svinicki, 2004)**: It is a process that helps students to learn in a deeper level. Each letter stands for a specific step on this process:

  - G = “Goal-Oriented” - The students should be able to set goals in their learning process.
  - A = “Active study” - Refers to active participation in the task.
  - M = “Meaningful and memorable study one strategy” - To accomplish this is by asking students to make their own examples, as well as making connections with other courses and units.
  - E = “Explain” the material in order to learn it. The strategy suggested that students should explain to someone else the content that has been learned.
  - S = “Self-monitoring” - One strategy suggested it to ask students to make and answer their own questions.

✓ **Self-determination theory (SDT)**: The study shows some of the types of regulation within self-determination theory (see Table 3):

  - *External regulation*: This first type of regulation is in relation with students’ extrinsic motivation to gain acceptance among students and teachers. In general, following roles and collaborating in teams can help to finish the course and avoid criticisms successfully. However, students in this type of regulation do not have internalized their behavior, and it is externally regulated as well as a form of controlled motivation (Vansteenkiste, Aelterman, De Muynck, & Haerens, 2018).

  - *Introjected regulation*: This type of regulation becomes is more of an extrinsic motivator than external regulation. However, the reasons for this motivation is to avoid guilty feelings or as a way to feel smart. Students study for an extended period, to avert guilty or have a performance that makes them feel smarter. The introjected regulation is similar to external regulation since it also presents a controlled motivation based on their performance (Vansteenkiste et al., 2010).

  - *Identified regulation*: In this type of regulation, students do take personal responsibility since they notice and accept their personal relevance of the activity. The motivation is more autonomous than the two previous types of regulation (Vansteenkiste, Aelterman, De Muynck, & Haerens, 2018).
• **Integrated regulation**: This type of regulation is the fullest form of internalization which it is anchored to values, commitments, and interests (Vansteenkiste, Aelterman, De Muynck, & Haerens, 2018).

✔ **Problem-based (PBL)**

  o The problem-based learning theory is a method that focuses on the student as a center of a learning experience, working collaboratively in practical problems with guidance from instructors. The PBL can be divided into three phases: a) pre-discussion, b) self-study; and c) reporting phase. Initially, students receive the problem even before they have learned any topic related to issue. Since the prior knowledge is limited at this stage, students are encouraged to investigate and explore components of the problem that they do not understand. Consequently, the students are prompted to self-study period since they should select the literature for answering the issues in the problem assigned. Furthermore, the staged pre-discussion and the reporting phase are guided and supported by the instructor (Wijnen, Loyens, Smeets, Kroeze, & van der Molen, 2017).

  o Four stages of PBL, similar to the previous description, this paper add an extra stage in the process, as well as it studied the cognitive functions that are perceived to be dominant on each stage (Chua, Tan, Liu, 2016):
    - **Stage 1 Meeting the problem:**
      • Cognitive functions: a) Looking from different perspectives, b) identification of the problem, c) using logical evidence, and d) generating many ideas.
      • The study’s findings suggested that when students are given unstructured problems scenarios. It provides the opportunity for them to review a problem from different and multiple perspectives.
    - **Stage 2 Problem analysis and learning issues:**
      • Cognitive functions: a) looking for a relationship, b) making connections, c) looking from different perspective, and d) elaborating ideas.
      • The study’s findings the students had important link with concepts by making relationships and establishing connections.
    - **Stage 3 Discovery and reporting:**
      • Cognitive functions: a) Synthesis, b) making connections, c) elaborating ideas, and d) planning for solutions.
    - **Stage 4 Solution presentation and evaluation:**
      • Cognitive functions: a) generating many ideas, b) evaluation, and c) synthesis
      • Learning-cycle approach “5E”

**Instructional Design Recommendations**

✔ **Helping student to develop skills** (Svinicki, 2004):

  • **Cognitive Apprenticeship**: Svinicki explains that from the different models designed to help students develop skills, apprenticeship is the oldest form of enhancing students’ skills. Even more effective than trial and error learning. One of the phases of this model is observation where it is created a mental model of the behavior needed to learn.
Motivation, on the other hand, is one of the elements required in all the phases in a learning task. Additional, the learning task must be modified if the skill that its need to enhance is not observable (Mental Skill). Svinicki provides a series of steps that cognitive apprenticeship model involves (Svinicki, 2004, p. 66):

A. **An Authentic task**: Illustrate the task in classroom settings that are authentic or similar to environment where the learned skill can be used.

B. **Narrated Modeling**: In this step the process needs to be demonstrated and observable, at least the thinking model that it is taken in place, making a visible aspect of it as well as allowing learners to participate on it.

C. **Scaffolded and coached practice**: The next step is allowing students to attempt the skill by scaffolding the activity from easy to hard, giving feedback and hints in the process.

D. **Articulation of the process by the learning**: In this step, the students are required to describe the process in their own words. It can allow the instructor to check understandings as well as help students to solidify students' learnings.

E. **Reflection on the process**: Once the students have mastered their skill, this step is to give the opportunity to reflect on their learning process.

F. **An exploration in new venues**: In this step, students are encouraged to transfer the skill in a diverse and different set of problems.

✓ “Helping student to help themselves” (Svinicki, 2004, p. 94): This model focused on help students with retention and transferring, explicitly encoding and retrieving their learnings.

- Enhancing Retention:
  - Focus on the key features.
  - Get lots of quality practice.
  - Build an organize knowledge base.
  - Give lots of space practice.
  - Avoid reconstruction of errors.

- Transferring: The Svinicki’s book divides the types of transference (2014, p. 100):
  - “Positive versus negative transfer”: A positive transference is when student’s learning is aided with what they have learned in the past. On the other hand, negative transference refers to the interference that previous concepts learned have in new learnings.
  - “Near versus far transfer”: The near transfer is those activities that require students to use similar rules that they have learned for being applied in a different, but similar task. An example of a near transference is the use of lab equipment. These types of tasks that applied similar rules will not interfere with students' new learnings. Far transfer refers to the task that is not similar to initial task, but where it is possible to apply same or similar principles.
• **Suggestions:**
  - “Make Initial learning situation more likely the transfer situation to encourage positive transfer” (Svinicki, 2004, p. 102).
  - Vary the practice situation where students can apply the knowledge in different scenarios.
  - “Transfer is more likely to occur if the response to be transferred was leaned just before a transfer opportunity” (Svinicki, 2004, p. 103).

галерея Process of Internalization, conceptual and practical considerations:

• Learners’ intrinsic motivation and learners’ integrated regulation: Activities that are perceived to be enjoyable, relevant, and meaningful to students are defined as operatives. Consequently, there can be a correlation between interesting and self-relevance in the way that intrinsic motivation and identified/integrated regulation co-occur. However, this correlation can positively relate but occurs in different levels in an operative activity (Vansteenkiste, Aelterman, De Muynck, & Haerens, 2018).

• Learners’ self-relevancy: In order for an activity to be a self-relevant, learners need to be able to identify them with their personal significance. The self-relevance and personal meaning can be strengthened if the regulation is in harmony with students’ values and commitments. However, the activity needs to allow students to obtain an outcome perceived as a significant (Vansteenkiste, Aelterman, De Muynck, & Haerens, 2018).

• External regulation is believed to be necessary for students to internalize motivation. However, there is no empirical study that proves it. On the contrary, the best way to develop value on uninteresting activity is by explaining the importance and personal relevance in students, this can help the activity to be sustained over time (Vansteenkiste, Aelterman, De Muynck, & Haerens, 2018).

• “From the SDT perspective, for a given rationale to be truly effective and to foster internalization, a second crucial ingredient is required—that is, the satisfaction of students’ psychological needs. The satisfaction of the basic psychological needs for autonomy, competence, and relatedness is said to energize the process of increasing internalization and integration” (Vansteenkiste, Aelterman, De Muynck, & Haerens, 2018, p. 37).

**SDT: Self-Determination Theory**
Figure 1
Flowchart of JiTT activities

Pre-Lecture Activities

Students prepare PowerPoint slides answering three main questions and upload slideshow on LMS

Instructor views sample PowerPoint presentations prior to lectures, and identifies gaps in knowledge, and adjusts lecture content

During the Lecture

Buzz groups: students answer three main questions

Anonymous student PowerPoints used as ‘talking points’ for discussion

Instructor provides own lecture and PowerPoint presentation

Post-Lecture Activities

Students do reflective quizzes to gauge their knowledge

Figure 2. Flowchart of JiTT activities
Figure 9 The matrix classroom stage 1
Figure 10 The matrix classroom stage 2
<table>
<thead>
<tr>
<th>Type of Motivation</th>
<th>Extrinsic motivation</th>
<th>Intrinsic motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of Regulation</strong></td>
<td><strong>Motivational force</strong></td>
<td><strong>Internalization</strong></td>
</tr>
<tr>
<td>External regulation</td>
<td>Commands, rewards, punishments</td>
<td>Lack of internalisation</td>
</tr>
<tr>
<td>Introjected regulation</td>
<td>Guilt, shame, ego-involvement</td>
<td>Partial</td>
</tr>
<tr>
<td>Identified regulation</td>
<td>Personal significance and value, relevance</td>
<td>Full</td>
</tr>
<tr>
<td>Integrated regulation</td>
<td>Harmony and coherence with other values, commitments</td>
<td>Fullest</td>
</tr>
<tr>
<td>Intrinsic regulation</td>
<td>Interest, enjoyment, curiosity</td>
<td>Not required</td>
</tr>
<tr>
<td><strong>Perceived self-relevance</strong></td>
<td>Low</td>
<td>Medium</td>
</tr>
</tbody>
</table>

**Table 3.** Overview of different types of regulation within self-determination theory. (Adapted from Ryan & Deci, 2000)