

Through action research I inquired into my pedagogical practice, where one of the research questions I asked was: How do I build teamwork within a Software Engineering Curriculum to engage students? (Russell, 2021).

I addressed the issue of integrating teamwork into my practice over two academic years as I taught an Agile Methodologies curriculum to two different cohort of students studying for a Level 8 Bachelor of Engineering (Software) degree. Each cohort consisted of a range of nationalities and cultures. The majority were from Ireland and China but the classes also comprised of students from Eastern Europe and India.

The Scrum Team

Agile software development is a process to create software products. A key component of this methodology is the concept of the 'scrum team' (Ashmore and Runyan, 2015, p.84) comprised of a group of 4 to 7 software engineers who have ultimate responsibility for building a software product. I took action to transform my practice to enact team-work based on the concept of the Scrum Team to:

provide students critical experience relevant to their future careers, [and] to set problems of greater scale and complexity than could be tackled individually, and [which] are a vehicle for socially constructed learning. (Neill, DeFranco and Sangwan, 2017, p.591)

Building Teamwork to Engage Students

To build teamwork and engage students, I encouraged collaborative learning in an environment where students work together, within a scrum team, using strategies which focus 'mainly on students' exploration or application of course material, not on the presentation of the material by the teacher' (Clarke et al., 2014, p.18:4). This involved me promoting aspects of learning such as group-work, leadership and other interpersonal skills, and problem solving skills as well encouraging the students to take responsibility for one's own learning and actions (O' Neill and Moore, 2008).

To do so, students were required to collaborate together over a semester on a real-world Software Engineering problem. I introduced students to the concept of '[c]ooperative learning' (Johnson and Johnson, 2018, p.1) as a means for them to manage their own and the team's engagement with the process of group-work within a scrum team. I explained the fundamental aspects of cooperative learning: positive interdependence, face-to-face interaction, individual and group accountability, interpersonal and small-group skills, and group processing.

Positive interdependence within teams requires that the participation of every member is necessary to the completion of the project. Face-to-face interaction is needed to figure out the logistics of completing the project as well as to exchange ideas and solve problems. Team members have both individual and group responsibilities that other team members hold them accountable for.

Interpersonal and small-group skills enable team members to develop skills, such as, how to resolve conflicts in a constructive manner or to ably draw upon the strengths of others to solve problems. The concept of group processing provides opportunities for individuals within a group to talk and reflect with one another about what worked and did not work while engaging with a project.

I not only had to explain these fundamental aspects of cooperative learning but, I also had to ensure that the real-world projects enacted by me provided students with opportunities to engage with all features of cooperative learning as they undertook their assigned projects.

I identified facilitation as a key process I must implement in building teamwork to engage students. As a facilitator I endeavoured 'not to teach or give information but rather to facilitate students reasoning through the problem' (Barrett, 2005, p.60), where I encouraged the students' active participation and collaboration within the team.

Students' Experiences of Engaging in Team-Work

Students unanimously agreed that team-work was an essential activity within their learning experiences. They felt 'group work... enhanced our experience on the course' [and their] overall experience with it was very positive' (Russell, 2021, p.169).

Some students were concerned with the random way that teams were selected, 'where everyone was put in a line and everyone was given a number [because it resulted in a] spread of ability across the teams [that] probably wasn't as good as it could have been' (Russell, 2021, p.170). Other students commented further that the selection process resulted in teams that realistically mirror the structure of teams within industry. They felt that when 'working with a team, or working with people, really, everybody will never be on the same level' (Russell, 2021, p.170).

Students discovered getting 'into groups [where] we didn't know the people [and] we were all from different backgrounds' (Russell, 2021, p.171) provided the basis for them to experience forming professional bonds, which resulted in them taking responsibility for group tasks and activities. However, students also recognised that for a variety of reasons some team members do not take full responsibility within their group because within some groups a small number of members needed to be "carried" (i.e. their work done by somebody else) as 'sometimes some of the group members can be lazy or [...] busy with other stuff' (Russell, 2021, p.173).

Team members experienced 'very good cooperation in terms of, when somebody had a problem, there was always somebody who would say yeah, I know how to do that, give me five minutes' (Russell, 2021, p.175). Finally, team-work was seen as a particular type of learning opportunity in that it was perceived as the vehicle which allowed the students to practice 'what was being taught [by utilising theory in] certain situations' (Russell, 2021, p.175).

Conclusion

In becoming the facilitator that I now am, I ensure I stand inside each team with students as we share meaning or understanding (Wenger, 1998). I no longer feel the need to control the discussion. I have learned to lessen my need to be fully in control of all conversations to the extent that all interactions now evolve in a dialogical manner in reaction to the ideas and any unplanned contributions from members of a group. I have learned to listen to, draw on, and be directed by the students' experiences as I enact team-work within the curriculum.

References

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