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Do Active Learning Classrooms make for Active Teaching?

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Abstract

This paper presents preliminary results from a research project at the University of Groningen where recently various Active Learning Classrooms (ALC) were created. It answers the research question "How do university teachers experience teaching in an Active Learning Classroom?". In total, 14 teachers participated in a survey which was conducted before and after their courses in an ALC. Results show that, in line with their expectations, teachers experienced their courses in ALC to be more active. It seems that the ALC indeed stimulated teachers to implement more active learning activities in their course, although teachers indicate they have not yet fully utilized the ALC. Therefore, we conclude it would be worthwhile to provide continuous didactic and technological support to teachers when adopting ALC in universities.

Keywords: Active Learning; Active Teaching; Active Learning Classrooms.

1. Introduction

In recent years, academic education has undergone a transition from traditional, teacher-focused education to innovative, student-focused forms of education such as active, collaborative and engaged learning. This development is based on new insights on learning processes and student learning success, which show that active involvement of students in the subject matter and learning in groups leads to better learning results and to processing the subject matter at a higher cognitive level than traditional education focused on reproduction (Finkelstein et al., 2016; Lasry et al., 2014; Talbert & Mor-Avi, 2019).

However, most classrooms are still designed for traditional education, where the teacher gives lectures by standing and speaking in front of the group, and the students sit in rows and listen. All resources available mainly serve to support the explanation by the teacher and thus the transfer of knowledge from teacher to student, rather than supporting active involvement of students in their learning process (Brooks, 2011). To facilitate the more student-focused forms of education, universities are investing in adapting existing and designing new learning spaces that enable active learning, so-called *Active Learning Classrooms* (Brooks, 2011; Lasry et al., 2014; Finkelstein et al., 2016). Active Learning Classrooms (ALC) are often characterized by a design and layout that encourages student participation and collaboration between students (Beery et al., 2013). The main characteristics of ALC are flexible positions of the teacher (in front, between, or behind the students), modular furniture (that facilitates different configurations and thus interactions, e.g. eye contact), online and offline possibilities to collect, present or exchange information in different ways such as digital screens and whiteboards (Finkelstein et al., 2016).

Although much research still needs to be done on the effectiveness and important characteristics of ALC, it is clear that the space in itself is not sufficient to activate students in their learning process: crucial in this regard are for example activating teaching strategies in which the teacher makes optimal use of the affordances of the space, prior experiences with teaching in such a space, and thorough course preparations (Beery et al., 2013; Thomas et al., 2018; Metzger & Langley, 2020; Lasry et al. 2014; Talbert & Mor-Avi, 2019). The relationship between active teaching and ALC is currently being investigated at the University of Groningen (The Netherlands) where recently various ALCs have been created. As a first step in better understanding this relationship, we try to answer the question "*How do university teachers experience teaching in an Active Learning Classroom?*". Their expectations and experiences are themed by their preparations, teaching strategies, assessment and room configurations of the ALC.

2. Method

2.1. Participants

During the 2020-2021 academic year, a total of 19 teachers who taught or were going to teach in the newly designed ALC were approached to participate in the study. Of those teachers, five dropped out for various reasons. A total of 14 teachers participated in the survey, 10 of which completed both the pre- and post-test. Two teachers only completed the pre-measurement and two teachers only completed the post-measurement. On average, they had 12 years of experience as a teacher (M = 12.36, SD = 9.6). One teacher had prior experience with teaching in an ALC and 10 teachers had some experience with different forms of active learning in academic education. The teachers were affiliated with five of the total of 11 faculties within the University of Groningen: Faculty of Arts, Faculty of Behavioral and Social Sciences, Faculty of Economics and Business, Faculty of Science and Engineering, Faculty of Spatial Sciences.

2.2. Instrument

In order to evaluate the experiences of the teachers with the ALC, a questionnaire was developed around central themes from scientific literature (Haines & Maurice-Takerei, 2019; Lasry et al., 2014; Kim et al., 2018; Hernández-de-Menéndez et al., 2019; Wright et al., 2019). These themes were "Preparations", "Teaching Strategies/Methods/Activities", "Assessment" and "Configurations/Technology". Some examples of the questions within these themes are presented in the *Results* section. The complete questionnaire can be shared upon request. Two versions of the questionnaire were developed for the pre- and post-measurement, respectively consisting of 20 and 13 questions (omitting the questions regarding general information in the latter). The pre-measurement focused on intentions and expectations about teaching in the ALC, the post-measurement focused on a reflection on the manifestation of those expectations. Both versions mainly consisted of open-ended questions.

2.3. Procedure

About a week before the start of each study period (four per academic year), teachers who would use the ALC that period were approached by email inviting them to fill in the pre-measurement of the questionnaire. About two weeks after completing each period, the same teachers were asked to complete the post-measurement. This happened for three of the four periods of the academic year 2020-2021. Due to practical matters, the teachers in the first period were only asked afterwards about their experiences. The questionnaires were distributed via Google Forms. It took approximately 25 minutes to complete each measurement.

2.4. Analysis

The responses to the open-ended questions were qualitatively analyzed by identifying emerging categories (e.g. hybrid teaching, technical facilities, obstacles), and subsequently structure the responses according to these categories to compare experiences of the participants. To enhance interrater reliability, the coding process was done independently by two researchers. Results are presented within the themes 'preparations', 'teaching strategies', 'assessment' and 'configurations of the ALC', in line with the structure of the questionnaire. We used quotes to illustrate the response of teachers.

3. Results

Twelve teachers were questioned about their preparations (pre-test) and experiences (post-test) with teaching in the ALC at the University of Groningen. Six of the twelve teachers made use of several ALC at the same time and close to each other, the other teachers used only one room. The rooms were all characterized by modular furniture, multiple whiteboards and varying technical facilities which could easily facilitate hybrid teaching. The extent of flexibility in configurations and technology did however differ between the rooms. The number of meetings per week within the ALC varied from one meeting of two hours per week to several full days spread over the period. The number of students present fluctuated between 16 and 32 students per meeting. Partly due to COVID-19 measures, almost all courses were given in hybrid form.

3.1. Preparations

At the pre-measurement, teachers were asked about their former experiences with active learning, and preparations for teaching within the ALC. All participating teachers were already experienced in making their courses more activating. Four out of twelve teachers mentioned that they were supported by an educationalist to adapt their course in alignment with the possibilities of the ALC. Teachers also mentioned that the focus was mainly on *discovering* possibilities within ALC: "*I had meetings with educational support to get a feel for all Active Learning Classrooms. We also had a practice session to try out practical aspects.*"

Sometimes more active forms of education were discussed in relation to the course design. One teacher answered the question "*Which teaching methods and activities are you planning on using?*" with "*I implement more project-based group work with mandatory preparation*". Other teachers mention that they made their course 'up-to-date', with some teachers indicating that they have adapted the course to the affordances of the ALC. An explicit link between the course design and the affordances of the ALC in terms of pedagogy and didactics was less mentioned, although two teachers used the ALC to facilitate "*Team Based Learning*".

More specifically, the technical facilities of the ALC were mentioned by almost all teachers as a major affordance and central theme in their preparations. This was enforced by the introduction of COVID-19 measures by the university, which limited the maximum number of students in all classrooms. As a result, these measures created a need for hybrid education where some of the students were physically present in the ALC, while others participated online during the meetings. The technical facilities of the ALC allowed about half of the teachers to optimize this hybrid education: "*We use the ALC as a hybrid workshop, in which students can move around, work in subgroups and share (online) material in a context where offline and online students work together*".

In retrospect, as mentioned within the post-measurement, teachers consider their preparations to be sufficient. On a scale of 1 (inadequate) to 5 (adequate), the teachers scored an average of 4.1 on the questions "*To what extent were your preparations for education in the ALC sufficient?*". Three teachers scored a 3. They said the technology sometimes had startup problems. Also, they indicated they would have liked a little more educational support on a didactical level: "*I expected a little more support for my bachelor's lecture series with the new teaching methods that I wanted to develop*". Furthermore, some teachers stated that they used fewer affordances of the room than planned: "*I used Team Based Learning, which went well, but we did not use all the intended facilities* [of the ALC]" (e.g. the computer screens present).

3.2. Teaching Strategies

When asked about intended teaching strategies to activate students within the ALC ("*Which teaching methods and activities are you planning on using? Consider, for example, different teaching styles, methods, pedagogies and didactics, goals or activities.*"), teachers mainly mentioned activities to stimulate active learning among students, such as: discussion, Perusall [an online collaborative annotation program], presentations, or team-based learning sessions. Teachers indicated that the ALC facilitates these activities. Furthermore, about half of all teachers say "group work with coaching support from the teacher" is the core of their teaching activities, in which the teachers use a combination of teacher- and student-centered strategies. One teacher concretized this finding as follows: "*I use a mix of short lectures combined with students working in groups on exercises and projects using e.g. whiteboards, assignments due every week, and a final project - again in groups.*". All 12 teachers who filled in the pre-test indicated using a combination of several activities, aimed at a more active role for students during the meeting in the ALC.

According to all teachers, the activities mentioned stimulate at least some degree of active learning. Many of the intended activities consist of activating students, reflected in learning activities such as collaborative thinking, discussion, reflection or group assignments. This allows students to become more actively engaged with the course content. Not only during

meetings, but also before and afterwards: "*In principle the course is more active due to mandatory preparation, working in groups during and outside contact hours, and the weekly assignments*".

In retrospect, 11 of the 12 teachers confirm that the course as taught in the ALC indeed stimulated active learning among students: "*Indeed! The student evaluations also showed that students especially appreciated the more active parts of the course.*". Another teacher states the benefits from physical attendance in an ALC compared to online participation. "*As a teacher, it was satisfying to see that the Active Learning Classroom stimulated the learning process. The students taking the course online through Gathertown* [an online simulation program for physical classrooms] *seemed much less active.*" Another teacher mentions student engagement: "*As far as I can tell, students become more involved within the ALC, compared to only online teaching*".

3.3. Assessment

Both formative and summative forms of assessment were mentioned when teachers were asked about the type of assessments used in their course ("*To what extent did you use the intended forms of assessment and/or testing?*"). The range was diverse: from online assessment via Blackboard [virtual learning environment and learning management system] used summatively, to weekly assignments with feedback and coaching during the meetings on site. The ALC particularly contributed to formative assessment for six of the twelve teachers who completed the post-test (*"during the tutorials in the Active Learning Room, students present a business case in groups, after which the summative test takes place in Blackboard"* and *"The ALC and its facilities foster more effective and efficient teamwork and inter-group discussions [which will be graded]"*), although they did not explicitly made this connection themselves. The other teachers mention that the ALC had no function in the assessment of the course.

3.4. Configurations of the ALC

Teachers who taught solely on-campus in the ALC mention the ability to switch between different configurations of the room as a major advantage in using the ALC, which was mentioned during the preparations as well as afterwards: "*I use the whiteboards, move tables and chairs A LOT during my meetings to facilitate different setups and exchanges. I also use the Polycam* [webcam for hybrid education]. *In addition, I ask physically present students to log in to Blackboard Collaborate via one of the screens present in order to work with online students in a break-out room*". Another teacher states: "*I am moving furniture to engage students in different setups*". Teachers use the different configurations in accordance with their (intended) teaching strategies. There do seem to be differences between classrooms

when it comes to flexibility. One room in particular (the most advanced and well equipped ALC) offered many possibilities for quickly switching between room configurations.

In retrospect, teachers are positive about the use of the ALC. Start-up issues were mainly technical challenges arising from having to switch to hybrid education. In addition, the COVID-19 measures had a restrictive effect on education. Nevertheless, the intended use of different configurations of the ALC had been carried out according to plan: "*We used the ALC as intended. Furthermore, the students used the big screens/computers and whiteboards in the ALC even more than we expected*". Although afterwards some teachers would have liked to make even more use of the technical facilities of the room. In addition, one teacher mentioned that they would have been able to switch between room configurations even faster if floor plans of different setups were available.

4. Discussion

This study presents a preliminary analysis of teacher experiences with the new ALC at the University of Groningen. The focus of this study is on how teachers prepare themselves and their course for teaching in an ALC, what their expectations were with teaching in such a space and to what extent those were met. With this study we aim to answer the question "*How do university teachers experience teaching in an Active Learning Classroom?*"

In line with their expectations, teachers experienced their courses to be more active when scheduled in an ALC, for example through the activities they chose to implement during their classes. Teachers indicate they felt that students showed more active learning in the ALC. Not only were the intentions of teachers focused on engaging students more actively with course content during meetings, the ALC also seems to trigger teachers to implement more active learning activities in their course design. This seems to be in line with findings from Talbert and Mor-Avi (2019) and Lasry et al. (2014), who all state that practices and beliefs from teachers are related to the positive effects of ALC. However, the analysis reveals that the courses included in this study already seemed to be somehow characterized by active forms of teaching and learning. Partly for this reason, the course designs of some teachers 'only' seem to have been adapted to the possibilities and facilities offered by the ALC. Also, due to COVID-19 measures, there was a strong focus on preparing hybrid education which probably influenced the experiences of teachers. Teachers indicate they have not fully utilized the possibilities of the ALC.

One interesting result is that most teachers did not yet consciously use the ALC for assessment purposes, whilst formative assessment plays a central role in active learning (Hernández-de-Menéndez et al., 2019). The relation between ALC and assessment deserves more attention in scientific literature and should be addressed in further research. Furthermore, teachers did experience differences between the various ALC at the University

of Groningen suggesting that the physical properties of the space can indeed influence the activity level in teaching and learning, opting for plenty of affordances through technology and furniture (Metzger, & Langley, 2020). Combined with the expressed desire of teachers to fully utilize the possibilities of ALC in their course, it seems worthwhile to provide continuous didactic and technological support to teachers when adopting ALC in universities.

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