Putting the S in SAU - Facilitating student ownership to capitalize on the effectiveness of student activated teaching for student learning

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Introduction

Student activated teaching (SAU, studenter aktiverende undervisning) are sessions centred on question-answer-based exercises in which students are taught in classes of approx. 25 students. Attendance is not mandatory but provides students with the possibility to work with and apply their knowledge of the course content, which they may have read in curriculum-relevant books and/or heard in lectures, in smaller groups and with the direct interaction of a teacher. The didactic basis for this type of teaching is found in the theory of cognitive constructivism, developed by Jean Paiget in the 1910s, which is a student-centred learning theory stipulating that learning happens when the students interpret the learning environment in the context of their own prior knowledge and experience (Dolin, 2015). Thus, learning results from active processing of the learning material by the student. From this follows, that the role of the teacher is to facilitate learning by providing students with the possibilities to work with the learning material on their own or with each other. An example of such a learning activity is peer discussion based on the teaching material, which is indeed at the forefront of SAU. This type of teaching activity is also suggested by newer didactic research to be an effective method for students to engage in peer-driven formative assessment as students compare, contrast and negotiate their, perhaps differing, perspectives of the learning content (Nicol & Macfarlane-Dick, 2006). Finally, the benefit of this form of student-activating teaching is exemplified by a large study across 62 physics courses in the US, which concluded that students obtained better scores when participating in

courses, which employed "interactive student engagement" compared to "traditional" methods (Hake, 1998).

Based on the above, SAU should be highly beneficial for student learning. However, SAU suffers from poor student attendance and preparation, both of which highly impair the benefit of this teaching activity for student learning. To address these challenges and increase the effectiveness of SAU for student learning, this study has attempted to facilitate student ownership with the hypothesis that a stronger level of influence and autonomy of the sessions would improve student participation and preparation.

Motivation and method

By taking a more student-centred approach to the SAU sessions by facilitating student ownership, students may become more invested in the teaching activity, resulting in a more effective use of SAU for student learning. Traditionally, most decisions about teaching activities are made by teachers, often leaving the students to passively record the information. As, according to constructivism, students learn by doing, involving students more actively in the learning activities by providing them with opportunities to take control of their learning, shifts the responsibility for learning in the direction of the student and promotes learning (Wright, 2011). Further supporting the more active involvement of students in their learning activities is self-determination theory, which emphasizes (in part) the necessity of autonomy for intrinsic student motivation (Ryan & Deci, 2020). A large body of empirical-based literature (reviewed in (Ryan & Deci, 2020)), supports that students of more autonomy-supporting teachers, experience more sense of initiative and ownership, which enhances student engagement and learning. Also, it is heavily emphasized in this literature that student autonomy starts with the teacher attempting to understand, acknowledge and be responsive to student perspectives and to provide students with meaningful choices. To be transparent and responsive to student perspectives before initiating this study, the concept of including more autonomy in SAU sessions was first introduced to the students in plenum during 10 minutes of a mandatory session in which all students were present. Following the acceptance of

the approach during this introduction, the study was conducted during the following five SAU sessions for one class of medical students. The approach taken to enhance student autonomy and influence over the SAU sessions in this study is centred on the intended learning outcomes (ILOs) of each session. In the beginning of each session, students were prompted to vote on which ILOs they deemed most important to work with (ILO pre-vote). Following this, the student-centred activities of the session were structured and prioritized based on the vote. These activities entailed problem-based group discussions using both ready-made questions and visual tasks (completing figures), taking up the bulk of the sessions, followed by consolidation and validation in plenum, of shorter duration, either by students presenting their findings visually (at the blackboard) or by teacher-facilitated discussions in plenum. Collectively, it is hypothesized that this approach will increase the sense of student ownership and co-direction of the teaching offered them. Through this, students may also gain (and understand the) incentive for SAU and thus increase student attendance and participation. Finally, as students will need to reflect on ILOs before each session to submit meaningful votes, it is hypothesized that this will prompt increased student preparation before each session.

Another aspect of student ownership towards learning is self-regulation – the ability of the student to regulate their thinking, motivation and strategies towards learning goals by generating internal feedback, in which current progress is compared to desired goals (Nicol & Macfarlane-Dick, 2006). Based on reviewing empirical evidence, Paul R. Pintrich concludes that self-regulated students are more effective, persistent, confident and resourceful and advocates that students be given more opportunities to practice self-regulation (Pintrich, 1995). Such opportunities can be in the form of frequent low stakes in-session formative assessment tasks, in which students have the chance to reflect on their own progress and which have been shown by multiple studies (reviewed in (Nicol & Macfarlane-Dick, 2006)) to enhance student motivation and self-esteem and ultimately improve learning (Knight & Wood, 2005; Nicol & Macfarlane-Dick, 2006). To capitalize on student ownership and provide students with opportunities for formative assessment in the approach to SAU described in this study, an end-of-

session ILO post-vote was introduced to parallel the beginning-of-session ILO pre-vote. In the ILO post-vote students were prompted to reflect on and vote for which of the session's ILOs they feel they mastered at this time. At the beginning of the next SAU session (and prior to the ILO pre-vote of this session), students were again given an opportunity to reflect on their mastering of the content of the previous SAU by contributing to a word cloud, which, by the end of the course, was intended to double as an exam tool with buzzwords for each SAU session. Furthermore, online pre- and post-SAU quizzes were available on-demand for students and were meant to inform students on their current level of understanding of the learning goals. Additionally, as highlighted by Mantz Yorke, these formative assessment tasks provide the teacher with valuable information on students' progress and knowledge gaps, which can be used to tailor the teaching to student's needs (Yorke, 2003). As there are direct readouts and statistics from ILO post-votes, word clouds and online quizzes, these were used to inform the focus on the SAU sessions on a continuous basis.

Finally, for autonomy-supportive teaching to be most effective, Richard Ryan and Edward describe the need for structure in the approach. This entails clear communication of expectations and goals and consistency in guidelines as means for a good informational support, scaffolding the learning activities (Ryan & Deci, 2020). To this end, an initial alignment of expectations was performed in the first SAU session, reiterating how the SAU approach would be conducted, the arguments for the approach as well as providing a second opportunity for student input. Furthermore, class-wide emails were sent out a day or two prior to each SAU session detailing the theme, learning activities and preparation needed (usually taking the pre-quiz and reading through the problem-based exercises of the session) for each session. Similarly, an email was sent out after each session containing relevant content produced by the teacher and students (e.g., slides, answers to problems, visualizations) as well as the result of the ILO votes and word clouds. This provides both the students and teacher with records of the formative assessment tasks performed for self-regulation purposes.

Results and discussion

To assess whether the approach described above was successful in promoting student ownership, self-regulation and learning, data were collected on student attendance in SAU as well as results of and participation in ILO pre- and post-votes, word clouds and online pre- and post-quizzes. At the end of the final SAU session, direct written feedback from the students was collected in an online anonymous format. This data is available in the appendix. In the following, the data collected, and observations made during and following the SAU teaching activities, applying the approach described, above as well as the same sessions conducted during the previous semester will be described and discussed.

Upon introducing the concept of this study to students in plenum during 10 minutes of a mandatory session, there was little immediate feedback from the students. A good deal of nods and smiles, but no questions, comments, or inputs. The same was true for the initial 10 minutes alignment of expectations in the first SAU session – nods of approval and acceptance but no further input. As a contrasting approach, a 30-minute meeting with the two class representatives (elected by the class as a whole) was conducted the previous semester. From this meeting, there was a great deal for information and input gained from the two students on behalf of their class. The question arises then, whether a short meeting with all the students or a longer meeting with two representative students is preferrable to this approach. It is preferrable, surely, to reach and inform all students directly. However, the above observations may indicate that at a first meeting, students may not feel comfortable speaking out in plenum and will rather rely on the traditional teacher-centric view on decision-making with regards to teaching activities. This is problematic as it effectively robs the students of contributing their influence on an approach that is meant to increase just that and student concerns may as a result only be revealed at a much later stage (see comment from student #15, Fig. 1). An initial safer environment supporting student input at this stage may be achieved by altering the atmosphere – e.g., talking with students in a more informal manner rather than the traditional teacher alone in front facing the students collectively.

Upon executing all five SAU sessions, an overview of the ILO pre- and post-votes prompts several observations. Firstly, most students present at the SAU sessions participated in the ILO pre-vote and thus exercises their opportunity for autonomy (Fig. 2). When analysing the distribution of votes (Fig. 3), most ILOs categorized as low priority by students (receiving less than 50% of possible pre-votes) were generally also deemed mastered by students (receiving more than 50% of possible post-votes). Additionally, about ⅔ of high priority ILOs (receiving more than 50% of possible pre-votes) were also generally deemed mastered by students. Very few low priority ILOs were not deemed mastered when assessed through ILO post-votes. Together, this data indicate that students have correctly assessed which ILOs they needed the SAU sessions to focus on, and gained mastery of most of these ILOs, while down-prioritizing ILOs that they did not need to allot further activity to. Students have thus grasped and made effective use of the possibility to influence and take ownership of their teaching activities provided by this approach. The remaining ⅓ of high priority ILOs, which were not assessed as mastered in corresponding ILO post-votes, indicate areas of weakness of the students towards SAU content and can thus serve as formative feedback both for student self-regulation and teachers' adaptation purposes. Feedback comments provided by students at the end of the SAU sessions also indicate that students appreciate and understand the benefits of the student-centred and autonomy-supported approach utilized in this study and, importantly, actively take advantage of it for self-regulation purposes (see comments from students #3, 4, 10, 11, 14 and 17, Fig. 1).

In contrast, some students express preferences towards a more "traditionalistic", teacher-centric approach focusing on the "correct" answers (see comments from students #2, 12 and 15, Fig. 1). On two occasions, when directly asked during SAU sessions, in which assignments proved more difficult, if the class would prefer additional time for discussing the material in groups or in plenum, the class professed a desire to do so in plenum. When granted, very few students participated actively. This indicates that the traditionalistic teaching culture is difficult to completely revert and if given the choice, students will often opt to have more teaching served to them by the teacher as

opposed to working with the content themselves. While an autonomy-supportive teacher may offer progress-enabling hints when students are stuck (Ryan & Deci, 2020), the benefit from actively working with the material is much greater than when absorbing it passively from the teacher – a fact the students well know (see comment by students #14, Fig. 1).

One student directly mentions concern that when adopting this approach not all course content is covered (see comment by student #15, Fig. 1). This is a caveat of the approach and was indeed directly mentioned to the students during the initial alignment of expectations to maintain transparency. But indeed, in none of the five SAU sessions was all the content intended for the sessions covered. The argument behind adopting this approach despite that risk was the perceived benefit from allotting extra time and focus to areas more needful for the students, while sacrificing the parts more easily covered in other learning activities or self-study. This is indeed also perceived by some students (see comment by student #17, Fig. 1). The desire of some students to cover all content superficially while potentially risking deeper understanding of the content may also be a sign of cognitive overload – paradoxically, the energy spent self-regulating and devoting extra resources to some content areas can be perceived by the student as greater than simply trying to encompass all content at an equal (lower) level. Another sign of this type of cognitive overload may be inferred from the observation that fewer students attend the SAU sessions over time as these get closer to the exam and students may instead prioritize self-studying e.g. rereading course curriculum.

Having established that most students successfully take advantage of the possibility to take control of their learning environment, does this, as hypothesized, also affect an increased student motivation for actively participating in the SAU sessions? Compared to the previous semester, indeed a few more students attended the SAU sessions (Fig. 4). However, whether this is due to the altered approach or the class culture as regards SAU attendance is difficult to conclude upon. As regards active participation, the students who did attend the SAU sessions all contributed to group work and discussions, posing, and responding to questions within and between groups as well as between the groups and

the teacher. This indicates that the students were indeed actively working with the content and successfully took advantage of the peer dialogue-based teaching activities. In contrast, the same 5-7 students tended to contribute when processing SAU content in plenum. Plenum may suffer from the same constrains as the class-wide introduction described above – students may not feel comfortable contributing in/to a wider audience. One suggestion could thus be to make these validating plenum sessions more similar to a continuation of the group work by adopting a cooperative learning approach (Johnson, Johnson, & Smith, 2014), in which group work would be validated by consolidating core concepts in new groups put together across the old.

The other approach taken in this study to enhance student ownership over learning was to promote student self-regulation through regular opportunities for performing formative assessment tasks via in-session ILO post-votes and word clouds and online pre- and post-quizzes. Despite explaining the benefit of and advocating these tools in the initial alignment of expectation as well as in email information throughout the teaching period, consistently fewer students participated in ILO post-votes than pre-votes (Fig. 2) and even fewer participated in generating word clouds or made use of the online pre- and post-quizzes (Fig. 5 and 6). One observation is that students tend to participate more in in-session activities (compare e.g. in-session ILO pre- and post-votes to online pre- and post-quizzes, Fig. 2 and 6). Thus, to improve participation in these activities, more time and effort should be allotted to conducting them in-session when students' attention is ensured. Another observation is that, like attendance in general (Fig. 4), participation in these formative assessment activities declined over time, possibly, as suggested above, due to content overload and nearing of the exam. Finally, while some students do seem to grasp the opportunity for self-regulation in these activities (see comments by students #4 and 10, Fig. 1), a lower degree of participation in these activities may be attributed to most students not perceiving the immediate benefit of performing them. For formative feedback tasks to be effective as a means for student-regulation, students need to develop self-assessment skills (Boud, 2000; Sadler, 1989). Strengthening this skill is something that could be awarded more focus from the teachers' side. This could, e.g., be done through an early general

introduction to university studies dedicated to informing and teaching students didactic theories and study strategies useful to them throughout their studies and professional life and by educating teachers in the importance of including regular low stakes formative assessment tasks in their teaching.

Finally, it was hypothesized that the approach adopted in this study would lead to better student preparation for each session. However, despite students' seeming desire to or realization that this approach does indeed require student preparation (see comments by students #6 and 10, Fig. 1), they did not seem to do so to a higher extend when compared to students of the prior semester: when directly asked whether they prepared for a session by studying the problem-based questions intended for the SAU session most students shook their heads. This lack of preparation is also evidenced by the low usage of pre-quizzes (Fig. 6). Therefore, the challenge of low student preparation for SAU sessions remains and will require other or wider approaches than those attempted in this study. One suggestion, based on the above observation that student participation is higher during in-session activities, is to directly involve, in-session, the results of the pre-quiz or a similar small between-session exercise designed to inform and prepare students for the content worked with in the following SAU session. A direct follow up on such a between-session activity may also serve as a small SAU session wake-up or kickstarting activity.

Perspectives and conclusion

The above sections describe the rationale behind enhancing student autonomy, the successful execution and results of this study in doing so. But what about autonomy support for teachers? A study based on 132 Israeli teachers and their 1000+ students concluded that more autonomously motivated teachers were experienced by their students as more autonomy supportive and that these students, in turn, were more autonomously motivated to learn (Roth, Assor, Kanat-Maymon, & Kaplan, 2007). During the execution of this study, a change in teacher autonomy was indeed observed as compared to the previous semester. The acceptance of not striving to cover all SAU content but rather gaining

the freedom to focus on subject areas that students found important, brought about a sense of relief. This in turn, affected a different teacher behaviour – more relaxed and present with an attitude of increased supervision, observation, and facilitation of student work, rather than direction and delivery of content. More (supportive) questions posed to students instead of directly answering questions from students. This more autonomy-supportive behaviour should be beneficial for student motivation (Nicol & Macfarlane-Dick, 2006; Roth et al., 2007) and further opportunities of autonomy for teachers could be implemented, e.g. by being more transparent with teachers regarding the opportunities for flexibility in their approach to teaching, if such a flexibility indeed exists, in order to more widely reap the benefits both for teachers' well-being and for students' motivation for learning. However, this will require a behavioural change in course- and teacher culture perhaps not easily implemented.

Similarly, it is not straight forward to implement the approach taken in this study course-wide (or even further), as the course taught in this study is a major first-year medical course involving 65+ teachers and 350+ students divided into 15+ classes. Because of the many teachers involved, this course may suffer from a lack of congruence in teaching approaches (Hounsell, McCune, Litjens, & Hounsell, 2006), maybe especially so if autonomy-support for teachers were indeed more widely extended. Didactic research shows that the learning strategy adopted by students correlate with the strategy employed by the teacher – a student-centred interpretive approach taught by meaning-oriented teachers correlated with a student deep learning approach, while a teacher-centric transmissive approach taught by reproduction-oriented teachers correlated with a student surface approach (Ramsden & Entwistle, 1981; Trigwell, Prosser, Ramsden, & Martin, 1998). As students clearly are influenced by the teacher and the teaching approach, the lack of congruence in teaching approaches in a large course could be confusing to students who could be exposed to different teaching approaches and be similarly confused as to which strategy to adopt themselves. This is e.g. evident from the comment of one student who would prefer consistency in SAU teaching (see comment by student #15, Fig. 1). Further, while students may perceive the benefits of the teaching approach conducted in

this study, they may revert to a more traditional one when pressured by e.g. time constraints, cognitive overload and exams. This was also directly observed in this study when one student during a SAU session professed the opinion that the teaching approach worked well, while later in the same session expressed that going through the entire SAU content in plenum had priority over focusing on (more difficult) parts of the content through group work. This observation may reflect a more deeply rooted surface approach among (some) students which may in fact be (unconsciously) promoted by a course with a 1000+ page curriculum, an overweight of learning goals of low taxonomic nature and an exam that similarly tests these. While displaying a high degree of constructive alignment, this may produce a backwash effect in relation to students' approach to learning (Biggs, Tang, & Kennedy, 2022). This is in alignment with other large first-year courses, which were similarly found to inspire student surface approaches (Hounsell et al., 2006). While it is desirable from a didactic point of view to promote student deep learning approaches, in this case, it may not be unfavourable to students' further studies to adopt a surface approach – the early placement and objective of this course being to provide a foundation for further knowledge within the study program to be later assimilated and accommodated onto.

This study demonstrates the potential benefits and describes a practical example of how to enhance student ownership and self-regulation through autonomy-supportive teaching and incorporating frequent low stakes formative assessment tasks with the ultimate purpose of promoting student learning. If applicable with regards to course congruence, this study can serve as inspiration for implementing such approaches elsewhere. For enhancing student-centred learning. For putting the 'S' in SAU.

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Appendix

Appendix A

Fig. 1. Feedback from students. At the end of the final of five SAU sessions, in which the approach described in this study was utilized, students were asked to provide feedback on the sessions in an online anonymous format. Shown are the raw exports of students' statements.
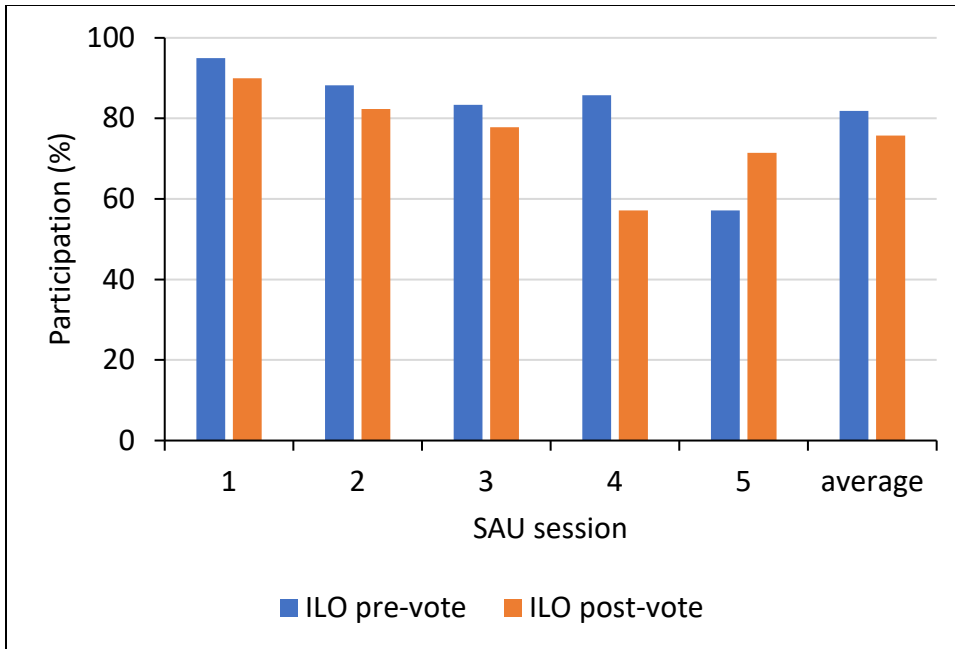
Fig. 2. Student participation in in-session ILO pre- and post-votes. The number of students registering votes in the ILO pre- and post-voting across the five SAU sessions in which the approach of this study was utilized is shown as a percentage of the number of students present at each of the SAU sessions indicated.
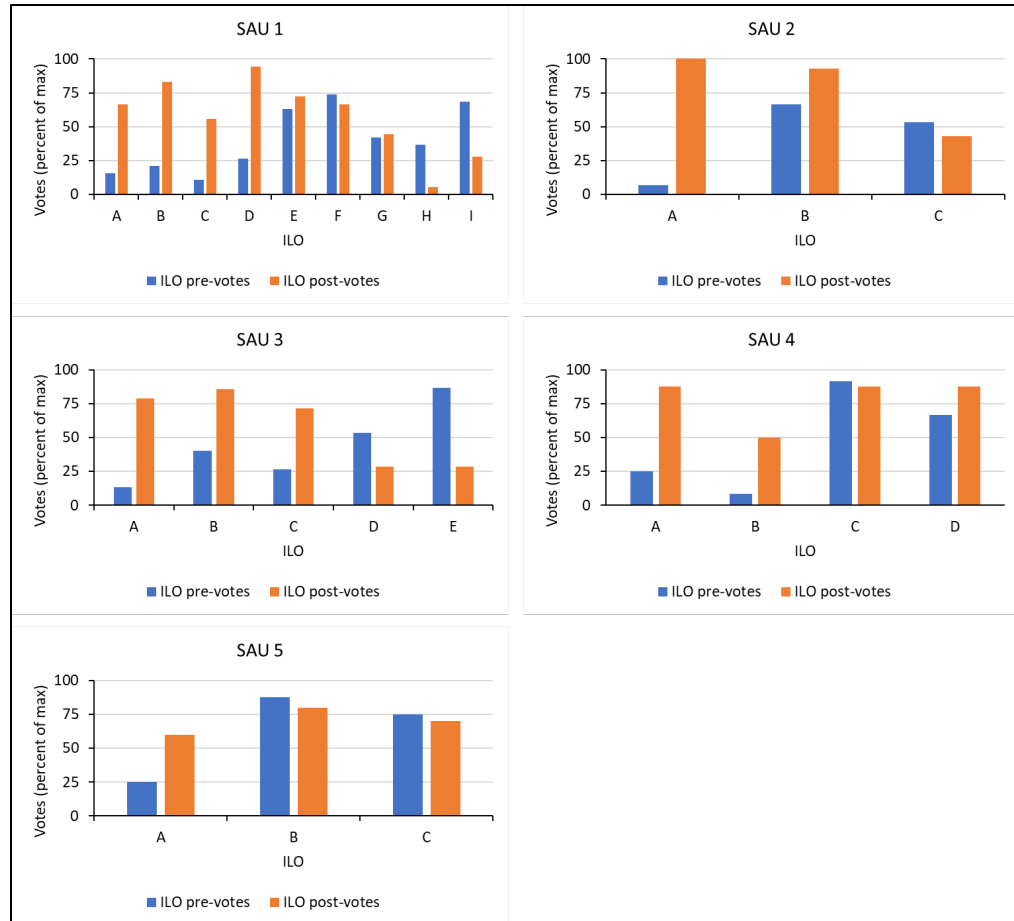
Fig. 3. Distribution of student votes in pre- and post ILO voting. Shown are one graph for each of the five SAU sessions in which the approach of this study was utilized. Each SAU session had separate session-specific ILOs. At the beginning of each SAU session, students were asked to vote for "which ILOs are the most important to work with today?" (ILO pre-votes). At the end of each SAU session, students were asked to vote for "which ILOs do I master?" (ILO post-votes). In each graph, the number of student votes assigned to each ILO in pre- and post-voting is given as the percentage of the maximum number of votes possible (equal to the number of students participating in the pre- and post-voting, respectively). Based on student pre-votes, ILOs are divided into low- and high-priority if receiving less or more than 50% of the pre-votes possible, respectively. Similarly, ILOs are deemed mastered by students if receiving more than 50% of student post-votes.
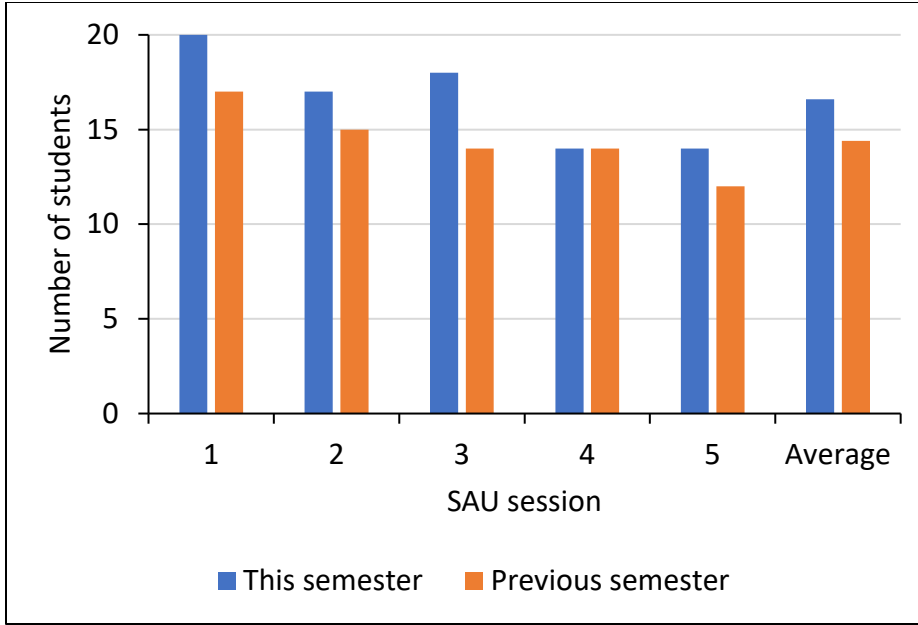
Fig. 4. Student attendance. Shown is a count of the number of students attending each of the five SAU sessions in which the approach of this study was utilized (this semester) as compared to the same sessions taught to a different class the previous semester.
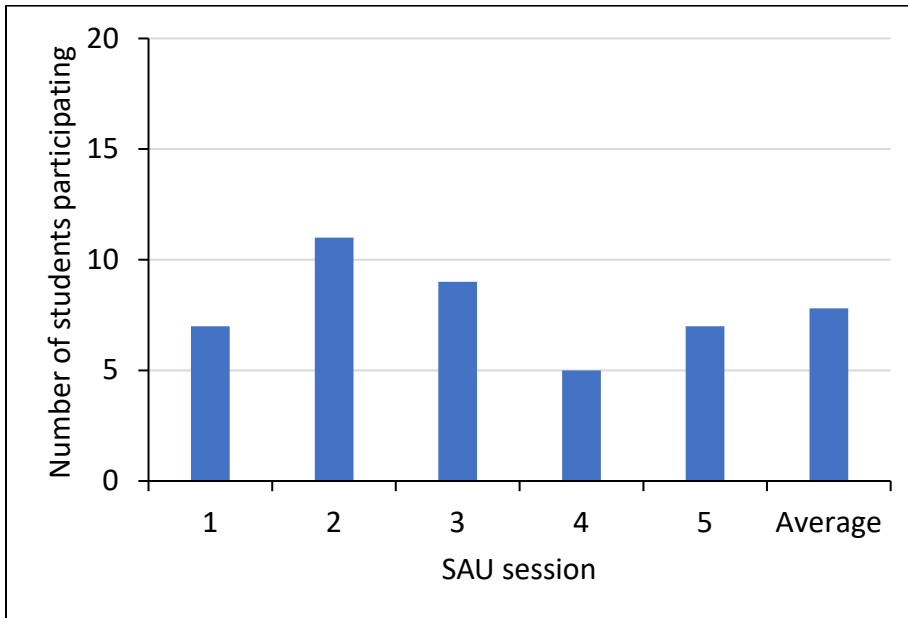
Fig. 5. Student participation in generation of word clouds. Shown is a count of the number of students who participated in generating a word cloud by writing one or more keywords related to the previous SAU session. Students were asked to reflect on the most important concepts of the previous SAU session at the very beginning of each of the five SAU sessions in which the approach of this study was utilized.
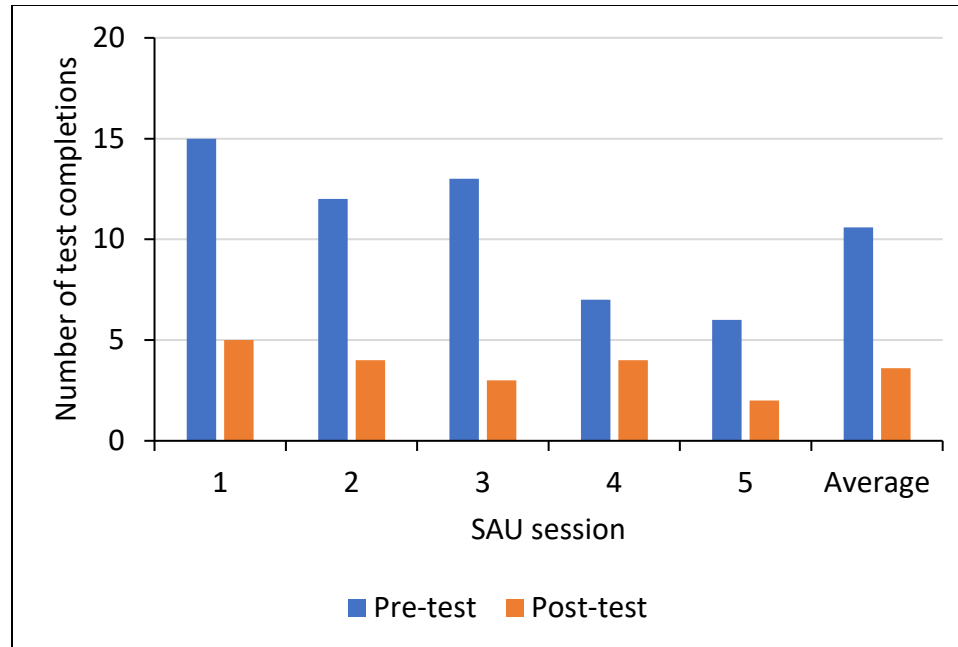
Fig. 6. Student utilization of online on-demand SAU pre- and post-quizzes.
Shown is a count of the number of times each quiz was completed by the class taught by the approach described in this study. The count was done after the exam, thus no further utilization of the tests was expected.