

The impact of cooperative learning on student engagement: Results from an intervention

Active Learning in Higher Education

14(3) 175–187

© The Author(s) 2013

Reprints and permissions:

sagepub.co.uk/journalsPermissions.nav

DOI: 10.1177/1469787413498035

alh.sagepub.com



Kim J Herrmann

Aarhus University, Denmark

Abstract

With an increasing awareness that many undergraduates are passive during teaching sessions, calls for instructional methods that allow students to become actively engaged have increased. Cooperative learning has long been popular at the primary and secondary level and, within recent years, higher education. However, empirical evidence of the impact of cooperative learning at the university level is still limited. This study reports the result of a quasi-experimental real-life intervention with cooperative learning in an undergraduate course. In-class participation and student approaches to learning were measured before and after the intervention to assess the impact on 140 students' engagement levels. In addition, open-ended comments were analysed, revealing what faculty adopting cooperative learning principles in higher education should be especially aware of.

Keywords

Approaches to learning, cooperative learning, engagement, participation, quasi-experiment, tutorials

Cooperative learning on student engagement

At many universities, undergraduates attend weekly tutorials to complement their lectures (Anderson, 2005). However, lack of student engagement is a widespread problem (Fritschner, 2000; Nunn, 1996; Rocca, 2010) even in the tutorial setting (Biggs, 2003; Kember, 1997). Race (2005) argues that 'doing' is one of the five pivotal factors underpinning successful learning, and from this perspective, the widespread passivity and disengagement is unfortunate. Student-centred teaching is one way of promoting student engagement, and cooperative learning is another; but many student-centred instructional methods are gaining popularity within the last decade (Baeten et al., 2010; Lea et al., 2003). Machemer and Crawford (2007) state that 'while active learning is doing, cooperative learning is doing with others' (p. 11).

Cooperation exists when individuals work together in a group in order to promote both their individual learning outcomes as well as the learning outcomes of their peers (Johnson and Johnson, 1989). Conceptually, cooperative learning is rooted within social interdependence theory and its

Corresponding author:

Kim J Herrmann, Centre for Teaching and Learning, Aarhus University, School of Business and Social Science, Fuglesangs Allé 4, 8210 Aarhus V, Denmark.

Email: kh@clu.au.dk

basic premise that ‘the way in which social interdependence is structured determines how individuals interact within the situation which, in turn, affects outcomes’ (Johnson and Johnson, 1989: 5). According to this theory, cooperation is most effective when students perceive that they share similar goals and when the individual members’ goals are positively dependent on the actions of the group. Such positive interdependence is assumed to enhance promotive interaction, that is, students encouraging and helping each other to reach their goals, students giving each other feedback, students challenging each other’s conclusions and reasoning, and students taking the perspectives of others to better explore different points of view. Promotive interaction, in turn, is expected to lead to higher academic achievement (Johnson and Johnson, 1989, 2009). Negative interdependence, on the contrary, exists when the efforts of others are detrimental to the students learning outcome (e.g. in a competitive learning environment), and an individualistic situation exists when the efforts of students are unrelated (Johnson and Johnson, 2009).

Cooperative learning is concerned with framing student interaction in ways that are likely to raise positive interdependence and promotive interaction. Jigsaw and think-pair-share (Johnson et al., 2000) are some examples of cooperative learning structures; however, any form of peer interaction can be cooperative if it adheres to two basic principles: positive interdependence and individual accountability (Millis and Cottel, 1998; Slavin, 1996). Positive interdependence means that group members should perceive that the collective effort of the group is essential in order for the individual learners to achieve their goals (Johnson and Johnson, 2009). Individual accountability means that, in order to prevent social loafing, the students should be assessed by their individual learning outcomes. Thus, while working within a group, the student might still pursue individual goals and be assessed as an individual. Awarding individual grades to students does not conflict with cooperative learning as it enhances individual accountability.

It has been debated whether it is necessary to let a minor proportion of the individual’s grade be dependent on the achievement of other group members’ achievement (reward interdependence) or if it is sufficient to let students work together towards a shared goal (goal interdependence). Slavin (1996) argues that there has to be an explicit reward associated with cooperation if individuals are to cooperate. Johnson and Johnson (2009) argue that goal interdependence and social motivation may be sufficient to produce higher achievement, although the combination of reward and goal interdependence tends to increase achievement more than goal interdependence alone.

Comprehensive meta-analyses have demonstrated that cooperative learning structures are related to higher academic achievement than competitive and individualistic structures (Dansereau and Johnson, 1994; Johnson et al., 1998, 2000, 2007; Johnson and Johnson, 1989; Roseth et al., 2008; Slavin, 1996; Springer et al., 1999). However, the vast majority of studies about cooperative learning are with children in primary and secondary schools. In recent years, the scholarly interest in cooperative learning has increased in higher education research (see, for example, Cavanagh, 2011; Hammond et al., 2010; Hillyard et al., 2010), but findings have been ambiguous and contradictory. In validation of social interdependence theory, a number of studies report cooperative learning to elicit more conscientious effort and stronger commitment to preparation. Nevertheless, the same studies also reflect a number of problems related to cooperative learning such as free-riding, resentment towards being dependent on peers, conflicts arising over varying levels of ambition, and distrust towards peers (Finlay and Faulkner, 2005; Hassanien, 2007; Kelly and Fetherston, 2008; Onwuegbuzie and DaRos-Voseles, 2001; Waite and Davis, 2006). Machemer and Crawford (2007) found that cooperative learning activities, unless they were perceived to relate to examinations, were valued less than lectures or other forms of active learning. Hillyard et al. (2010) found that students’ attitudes towards working in groups were related to their perception of the value of peer interaction, their previous experiences with working in groups, and, most importantly, the

individual teacher's clarity in explaining the purpose of group work. Hammond et al. (2010) reported that students valued the social aspects of working with peers, but that they were less likely to agree that cooperation helped them achieve better in assessed tasks.

Cooperative learning has also been implemented in lectures, but results are contradictory. While Vreven and McFadden (2007) found that students did not benefit from cooperative learning activities in lectures, students in a study by Cavanagh (2011) greatly valued opportunities for engaging in lectures by means of cooperative learning activities. There are two studies that suggest that the way students in higher education perceive of 'good' teaching may conflict with cooperative learning. Kelly and Fetherston (2008) interpreted resistance towards cooperative learning as reflecting a transmission model of teaching and learning in which the teacher is considered the sole expert. Phipps et al. (2001) reported how students associated the lecture with proper teaching at the university level and perceived their own role to be passive note takers. Indeed, these findings within higher education are quite different from the findings at the primary and secondary levels of education.

Conceptualising student engagement

Active learning is concerned with motivating students to engage meaningfully in their courses and in their classes. Engagement, or activity, however, is an ambiguous concept (Trowler, 2010), and this section describes what is meant by engagement in this particular study. Two forms of engagement are investigated. The first construct, approaches to learning, offers a qualitative description of the students' motives and strategies that are strongly related to high-quality learning outcomes (Biggs and Tang, 2011). However, approaches to learning do not directly target the extent to which students' engage in debate and discussion during tutorials. The second construct, in-class participation, targets the students' willingness to engage in discussion, putting forward their understanding and offering comments.

The concept of approaches to learning is firmly established within the educational research literature (Entwistle and McCune, 2004). The surface approach stems from an intention to pass the course with minimal effort and is accompanied by a strategy that focuses on facts and rote learning. The deep approach is based on personal interest in the subject matter and involves a strategy in which the student seeks to understand and uncover the meaning of course material (Biggs and Tang, 2011; Entwistle and McCune, 2004; Marton and Säljö, 2005). Although the two approaches are not 'good' or 'bad' per se, a deep approach is advocated to be in line with general intended learning outcomes in higher education (Biggs and Tang, 2011) and especially when the intended outcome is understanding (Hounsell, 2005; Marton and Säljö, 2005). Approaches to learning are not stable traits but have been found to vary between and within students sympathetically to the students' perception of the learning environment (Eley, 1992). Hence, Kember et al. (1997) argue that approaches to learning are valid indicators of high-quality learning when evaluating instructional methods.

Recent research has focused on engagement as *in-class participation* (Floyd et al., 2009; Fritschner, 2000; Nunn, 1996; Rocca, 2010; Sidelinger and Booth-Butterfield, 2010; Weaver and Qi, 2005). As this research literature rests primarily on data-driven empirical studies (Rocca, 2010), the concept of participation and its measurement is not as clearly defined and operationalised compared to approaches to learning; however, in general, participation in this literature has come to mean the student's contribution to the discussion or at least the student's willingness to communicate and contribute. In the Rocca (2010) review, participation is operationally defined as making comments, asking questions and signalling a willingness to answer through raising one's hand.

Such quantitative and overt means of conceptualising in-class participation have been criticised, in that they might confuse cognitive activity with behavioural activity (Meyer, 2009) and ignore the qualitative dimension of participation (Petress, 2006). Such critique should be taken into account when interpreting results; however, a qualitative dimension of participation poses a measurement challenge that has not yet been solved (Rocca, 2010). Also, even though students might perfectly well be learning by listening and not engaging in external dialogue, dialogue, especially argument, is pivotal in teaching from a constructivist perspective (Pritchard and Woollard, 2010). Biggs and Tang (2011) argue that conceptual changes takes place when ‘student work collaboratively and in dialogue with others [...] Good dialogue elicits those activities that shape, elaborate and deepen understanding’ (p. 23).

The review of the literature strongly suggests that the positive effects of cooperative learning found at the primary and secondary level cannot readily be expected to transfer to higher education. In line with recent research about cooperative learning in higher education, the aim of the study is to assess the impact of cooperative learning on student engagement. It sets out to answer the following questions. One, to what extent does cooperative learning increase student engagement in tutorials? Two, how do undergraduates perceive cooperative learning?

Methods

Case description

Political Theory is a semester-long course in a political science programme at a Danish university. Weekly lectures are complemented by tutorials in which 20–25 students meet with a tutor to discuss worksheet questions which students are supposed to answer in advance. Efforts to prompt undergraduates to be active participants in the discussion had been established prior to the cooperative learning intervention: Nearly all students are members of voluntary study groups of three to five members meeting outside classes. The four worksheet questions structure the tutorials. In the first three questions, the students have to describe, explain or compare political theories. In the last question, students have to apply the theory on a real case (e.g. an editorial). In the final examination, the students were asked to describe, relate, discuss, critically evaluate and apply theory.

For many years, student presentations have been an integrated part of tutorials at the department. Each question is delegated to a study group, which has to prepare a presentation and consult the tutor during office hours to have the presentation approved. Often the groups presenting write short handouts which are uploaded to the learning management system. Although student presentations combined with discussion in principle allow for all students to become engaged, disadvantages have been noticed at the department for some years; some students (the group holding the presentation) tend to be very engaged and well-prepared while the majority of students seem rather passive and only occasionally join in the plenary discussion. In many respects, the student presentation thus seems to share the same drawbacks as those of lectures.

Cooperative learning was introduced in tutorials to increase overall student engagement. Students were told that there would be no student presentation. Instead, when coming to tutorials, students were placed in random ad hoc groups with three or four peers from other out-of-class study groups. Each of these groups was told to work on one of the first three worksheet questions. Students were each asked to briefly present their answer to the question. The ad hoc group then had to discuss the different answers and perspectives, and synthesise these into an answer or argument they could agree on. After this, the tutor picked a group to explain their work, and other students were invited to share their perspectives in a plenum discussion. Finally, each group had to discuss

the fourth question, in which they were to apply the political theories on a case. Again, group work was followed by plenum discussion.

Intervention design and data collection

The intervention lasted 10 weeks of a 14-week semester. In a pre–post design (Kember, 2003; Shadish et al., 2002), tutorials were organised as usual during the first 5 weeks, and thereafter cooperative learning was introduced. Students were informed of the intervention at the start of the semester, but without revealing the purpose of the study.

The revised Study Process Questionnaire (R-SPQ-2F) is constructed to measure qualitative differences in students' approaches to learning (Biggs et al., 2001) and has been recommended as an evaluation tool of instructional innovations (Kember et al., 1997). A validated version of the R-SPQ-2F translated into Danish was used (Lassesen, 2012); hence, only reliability of scales were statistically examined. The reliability statistics for the deep approach ($\alpha = .805$) and surface approach ($\alpha = .793$) were found to be satisfactory.

The participation scale was adopted from a broader questionnaire developed by the author including scales that are not considered here (responsibility, preparation and perceived learning outcome). The dimensionality of the 25 items was tested in a separate exploratory factor analysis. In the process of finding a satisfactory component structure, a total of six items were deleted. The final principal component analysis with 19 items showed four components with eigenvalues greater than one (Kaiser's criterion (Tabachnick and Fidell, 2007)), explaining 64.3% of variance. After varimax rotation, all items loaded greater than 0.4 on one of the four components. The participation scale, which is relevant to this particular study, comprises six items ($\alpha = .917$) describing student in-class participation; for example, 'In tutorials I often share my personal understanding of course material' or 'In tutorials I often contribute to discussion with comments'. These items are consistent with definitions and survey questions in other studies measuring in-class participation (Rocca, 2010; Sidelinger and Booth-Butterfield, 2010). Questionnaires included open-ended questions to provide students with an opportunity to express how they experienced cooperative learning.

Results

The impact of cooperative learning on student engagement

Pre-data were collected at the end of the 5-week teaching period as usual ($n = 190$), and post-data were collected 5 weeks after the cooperative learning intervention ($n = 170$). In both instances, 100% of the students present completed the questionnaires. A total of 218 students provided data. In comparison, the total enrolment for that cohort was 234. Only data from 142 students answering both questionnaires were included in the statistical analysis. Data were examined for missing values. In cases where values were missing on one or two scale items, these were mean-substituted, which is preferable to deletion when scale reliability is greater than 0.7 (Schafer and Graham, 2002). One case was deleted due to values missing on more than half of the scale items. No serious outliers were found.

Within-subject changes on deep approach, surface approach and in-class participation scales were analysed using dependent samples t-test. On average, students did not adopt a deeper approach when participating in cooperative learning tutorials ($M = 23.30$, standard error of mean (SEM) = 0.463) compared to student presentation tutorials ($M = 23.02$ SEM = 0.492), $t(140) = -0.930$, $p > 0.05$, $r = 0.08$. Nor did they score higher on the surface approach scale in the cooperative

Table 1. Undergraduates' attitude towards cooperative learning in tutorials.

	Mostly positive	Positive and negative	Mostly negative	N
Tutor 1	5%	11%	84%	37
Tutor 2	32%	38%	29%	34
Tutor 3	34%	37%	29%	35
Tutor 4	41%	24%	35%	29
Total	27%	27%	45%	135

Note: 35 students could not be categorised due to comments that did not target cooperative learning in particular.

learning tutorials ($M = 25.46$, $SEM = 0.510$) compared to student presentation tutorials ($M = 25.86$, $SEM = 0.490$), $t(140) = -0.553$, $p > 0.05$, $r = 0.05$). However, on average, students did participate more in the cooperative learning tutorials ($M = 18.37$, $SEM = 0.497$) compared to the student presentation tutorials ($M = 17.65$, $SEM = 0.498$), $t(140) = -2.405$, $p < 0.05$, $r = 0.199$.

Because students were taught in a total of eight sections each comprising 20–25 students, and by four different tutors, who plausibly could affect the implementation of cooperative learning, separate analyses were run to examine whether the tutor, along with the variables gender, age and high school grade point average (GPA), did moderate the impact of the intervention. This was done by computing the individual student's change score for each of the dependent variables. Then for each dependent variable, an analysis of covariance (ANCOVA) was run with change score as the dependent variable, age and High School GPA as covariates and tutor and gender as fixed effects. Any significant effect of the independent variables would thus indicate a moderating effect.

In the first ANCOVA, none of the independent variables significantly predicted change scores on the students' deep approach. However, in the model with surface approach as the dependent variable, the change scores varied significantly across tutors, $F(3, 130) = 4.162$, $p < 0.05$, partial $\eta^2 = 0.088$, controlling for the effects of gender, age and high school GPA. Likewise, change scores on the in-class participation scores varied significantly across tutors, $F(3, 130) = 3.626$, $p < 0.05$, partial $\eta^2 = 0.077$.

Students' perception of the cooperative learning experience

The questionnaires included two open-ended questions: Consider the last 4 weeks – (1) What parts of the tutorials did you learn from and why? and (2) what parts of the tutorials did you not learn from and why? Of the 170 students answering the post-test questionnaires, 160 students described their experience of working cooperatively during tutorials, resulting in written material of 8484 words.

To assess the overall attitude towards cooperative learning, comments were read, and each student categorised as either 'mostly positive towards cooperative learning', 'mostly negative' or 'positive and negative' (meaning that positive and negative aspects of the cooperative learning experience seemed to be equally strong). Inter-rater agreement with a research assistant was 66%, and disagreements regarding the last 34% were easily solved by discussion. While 27% were mostly positive towards cooperative learning, 45% were mostly negative. However, it is striking how the students' attitudes are dependent on the tutor. In the classes of *Tutor 1*, 85% of the students were mostly negative about working in cooperative groups. In the classes of *Tutor 2*, 3 and 4, the

Table 2. Students' perception of tutorials incorporating cooperative learning groups.

	Theme	Description	Examples	N
Positive experiences	Becoming engaged	Experiencing being more active in class	I've become more active and have the courage to say something during tutorials To a much higher degree than before, allowed to formulate one's answer and discuss one's understanding of a given question	25
	New perspectives	Appreciating and learning from the input of peers	It's a clear advantage to discuss the material with people one doesn't normally discuss things with – one gets new points of view on the subject	37
Negative experiences	Preparation	Peers being unprepared or ignorant	If one ends up in a group where the others are not prepared the discussion doesn't lead anywhere	8
	Redundancy	Group discussion perceived to be superficial or redundant	We have often reached the same conclusions	31
	Confusion	Perspective of peers adding increasing confusion	Feels like a duplication of efforts Often creates more confusion than clarification because people understand the question differently	14
	Tutor control	Wanting the tutor to take greater control or cover the correct answers	It's not until the tutor outlines what is correct and what is wrong that I learn something	49
	Missing right answer	Fear of missing important points. Strong focus on exactly the right answer	Present form creates bad notes	29
	Complexity, time pressure	Unclear questions or complex subject matter	There has to be more focus on what's right and what's wrong With difficult topics it is important that presentations are rigorous – this is not always the case	18

Note: N is the number of students expressing this perception.

proportion of students who were mostly positive towards cooperative learning is very similar to the proportion of students that were mostly negative (Table 1).

These results raised new questions: Which aspects of cooperative learning did students favour and which aspects did they not favour? Why would some students strongly embrace cooperative learning while others would resent it? Comments were read once again, and recurring themes were identified and coded for. The far right column of Table 2 shows how many students touched upon these themes in their written comments, thus giving an impression of the most salient themes.

Some students enjoyed being more active in class and appreciated the input and perspectives of peers:

The group work has been really good!!! I've learned a lot and it's nice to say it out loud as much as I do now. Without doubt, I feel more active during classes now! I feel that I learn a lot from that. At the same time I prepare more ... than I used to.

It seems to me that I learn a lot from discussing and developing arguments in the groups ... It's also much more rewarding to have the others' point of view, especially if there is a difference, which I am surprised there often is.

The discussions during tutorials are now much more among the students rather than between the tutor and one student raising a hand.

However, the increased and required peer interaction could easily become a source of frustration for various reasons. First, sometimes students would experience peer interaction as being redundant: the questions or subject matter would be either too easy or too difficult; peers might not be prepared, even though free-riding is hardly mentioned in the data. Second, while the perspectives of peers might broaden the students' personal understanding, it might as easily cause confusion about which perspective was 'right'. Many students were afraid that they might miss key points and were very concerned with leaving the tutorials with comprehensive and correct notes:

Group talks often create more confusion than clarity as people understand the question in different ways ... people have often understood the question in the wrong way and we don't get to the bottom of things.

[Answering to what they have not learned from] All the flighty discussions → We need more structure and correct, *comprehensive* answers on the board. The present form results in bad notes.

I feel that we are not going deep enough and therefore I am anxious about the exam ... With presentations [prior to the intervention] you always get good notes and you can reach a higher level when preparing for the exam.

The most reoccurring theme in the data is the tutor. With only one exception, students want the tutor to take greater control in class. Whereas some students want the tutor to better lead discussion, others would prefer the tutor to lecture rather than having to listen to the (little appreciated) comments from their peers:

It can be difficult to leave the tutorial with good notes which one feels that one can trust. It may also be due to the tutor's inability to give clear answers. We need a short conclusion summing up things at the end.

[Answering to what they have learned from] Alex's [the tutor] presentation ... The subject matter is difficult and complex, so it's nice to have him cover it in a structured and clear way.

I really haven't learned much working in groups ... Time is too short, no one makes the right points. We are just waiting for Alex [the tutor] to give it ['it' in this context refers to the 'right points'].

Conclusion, discussion and perspectives

When cooperative learning was introduced in tutorials, students increased their in-class participation, whereas no change in the students' approaches to learning could be measured. From a constructivist perspective of learning, dialogue and argument are valuable learning opportunities (Biggs and Tang, 2011; Pritchard and Woollard, 2010), and from this perspective, the intervention was partly successful. However, results also indicate that changing the instructional method is in itself not enough to discourage a surface approach and promote a deep approach to learning.

Working cooperatively thus seems to have affected the students' learning behaviours without affecting the students' motives which are essential to the quality of the students' approaches to learning (Biggs and Tang, 2011). In the terminology of Race (2005), cooperative learning might have affected the 'doing' without affecting the 'wanting'. Students may have appeared to engage more actively in discussion, still, this does not necessarily imply that cooperative learning increased their cognitive activity (Meyer, 2009).

The written comments revealed very different attitudes towards cooperative learning. Whereas some students valued the opportunity to become active in discussion, many students were frustrated that it meant less time for the tutor to 'teach', fewer notes and 'right' answers', and greater exposure to misconceptions. All these short comments might be interpreted within a greater narrative, summing up the students' overall experience of the intervention. During the student presentation, few students except for the presenters would become engaged. However, from the students' point of view, the benefit would be that 'someone' had 'learned' the 'correct answers' and could thus 'reliably' 'pass them on' to the others. The tutor would have approved the presentations beforehand, and discussion was 'kept on track'. All that was required of the listener was to take notes. When cooperative learning replaced student presentations, all students were invited and required to share their answers and perspectives. This meant that new perspectives could be shared, but at the same time that misunderstandings could freely emerge. From a teaching perspective, eliciting and correcting misunderstandings is an important function of teaching complex social science concepts, and indeed, many students were happy to engage in discussion. However, seen from the perspective of those students who expected a correct and comprehensive review, essentially a lecture, eliciting misunderstandings hardly made any sense.

These perceptions of cooperative learning are in line with studies cited earlier in this article suggesting that students with a transmission conception of teaching and learning oppose cooperative learning (for example, Kelly and Fetherston, 2008). The cooperative learning literature has focused a lot on 'structures' (e.g. think-pair-share and jigsaw), assuming that if structures supported positive interdependence and individual accountability, students would engage in promoting interaction (Johnson and Johnson, 2009). The problem with this basic assumption is that it assumes that students are likely to perceive of and respond to cooperative learning the same way. This is clearly not the case. Results from this study suggest that implementing 'structures' is not enough. The students' conception of what constitutes 'good' university teaching needs also to be addressed. If the tutorial is essentially considered a small-scale lecture in which information is passed from expert tutor to novice student, then any 'structure' may potentially increase student interaction, however, not necessarily the depth and quality of the interaction. We need also consider the students' intentions and motivation. The written comments suggest that externally motivated students were unlikely to appreciate becoming active learners themselves. If cooperative learning is to make sense to these students, they need to see how engaging in discussion with peers makes a difference to their own achievement; thus, cooperative learning activities need to be aligned with examinations and assessment criteria. Finally, the cooperative learning literature hardly addresses the role and the impact of the teacher. Nevertheless, the students' attitudes toward cooperative learning were highly dependent on the tutor. Future research might address in which ways teachers might affect students' attitudes to cooperative learning.

Some limitations should be considered when interpreting the study's results. Methodologically, the pre-post design is often considered a weaker design than, for example, the control group design (Shadish et al., 2002); however, in non-laboratory educational settings in which the subjects of the

'treatment' are in close proximity with each other, the use of the control group design has been shown to be very problematic for a number of reasons, and the pre–post design with multiple sources of data has been proposed as an alternative (Kember, 2003). Second, the length of the intervention and sequencing might influence results. In a department with such a strong tradition for student presentations as the pedagogical tool of choice, 5 weeks with an alternative mode of instruction might not be enough to initiate change. Third, comparing two instructional methods that can both be considered student-centred is obviously a hard case. On the contrary, comparing cooperative learning tutorials to, for example, lectures, and finding that students participated more in discussion and adopted a deeper approach to learning would neither be surprising nor especially interesting. Today, the combination of lectures and tutorials is widespread in many universities. The interesting question is still how tutorials with often 25–30 students can be organised in a way that encourages students to engage in discussion. The written comments strongly suggest that student presentation and cooperative learning were in fact perceived to be two very different ways of teaching.

Cooperative learning groups can offer potentially valuable learning opportunities, but teachers need to be aware that simply adopting one of the cooperative learning structures does not necessarily promote deep engagement. On the contrary, teachers should expect some resistance, and the following issues should be carefully considered. First, the task and the subject matter have to be sufficiently challenging without being too difficult. Discussing, applying and interpreting might be more meaningful tasks to cooperate on than the easier task of defining and explaining concepts. Second, the teacher has to strike a very delicate balance between supporting students and ensuring they are on track without starting to lecture. This is indeed very difficult because some students strongly prefer the teacher to elicit the correct answer rather than facing the challenging task of engaging in conversation, confronting their own misconceptions and those of peers. Finally, students are unlikely to fully engage in cooperative learning unless it is meaningful to them and to students that are not internally motivated this might imply explicitly ensuring alignment between cooperative learning activities and assessment criteria. Teachers also need to invest time carefully explaining the intention and purpose of cooperative learning and confronting conceptions of university teaching in which the teaching is the passive transmission of information from tutor to student.

Acknowledgements

The author would like to thank Dr Torben K. Jensen and Dr Velda McCune for their helpful comments on earlier versions of the article.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

References

- Anderson C (2005) Enabling and shaping understanding through tutorials. In: Marton F, Hounsell D and Entwistle N (eds) *The Experience of Learning: Implications for Teaching and Studying in Higher Education*, 3rd Internet edition. Edinburgh: Centre for Teaching, Learning and Assessment, University of Edinburgh, pp. 187–97.
- Baeten M, Kyndt E, Struyven K, et al. (2010) Using student-centered learning environments to stimulate deep approaches to learning: Factors encouraging or discouraging their effectiveness. *Educational Research Review* 5(3): 243–60.

- Biggs J (2003) *Teaching for Quality Learning at University: What the Student Does*, 2nd edn. Maidenhead: The Society for Research into Higher Education, Open University Press.
- Biggs J and Tang C (2011) *Teaching for Quality Learning at University: What the Student Does*, 4th edn. Maidenhead: The Society for Research into Higher Education. Open University Press.
- Biggs J, Kember D and Leung DYP (2001) The revised two-factor study process questionnaire: R-SPQ-2F. *British Journal of Educational Psychology* 71(1): 133–49.
- Cavanagh M (2011) Students' experiences of active engagement through cooperative learning activities in lectures. *Active Learning in Higher Education* 12(1): 23–33.
- Dansereau DF and Johnson DW (1994) Cooperative learning. In: Druckman D and Bjork RA (eds) *Learning, Remembering, Believing: Enhancing Human Performance*. Washington, DC: National Academy Press, pp. 83–111.
- Eley MG (1992) Differential adoption of study approaches within individual students. *Higher Education* 23(3): 231–54.
- Entwistle N and McCune V (2004) The conceptual bases of study strategy inventories. *Educational Psychology Review* 16(4): 325–45.
- Finlay SJ and Faulkner G (2005) Tête-à-Tête: Reading groups and peer learning. *Active Learning in Higher Education* 6(1): 32–45.
- Floyd KS, Harrington SJ and Santiago J (2009) The effect of engagement and perceived course value on deep and surface learning strategies. *Informing Science: The International Journal of an Emerging Transdiscipline* 12. Available at: <http://www.inform.nu/Articles/Vol12/ISJv12p181-190Floyd530.pdf>
- Fritschner LM (2000) Inside the undergraduate college classroom: Faculty and students differ on the meaning of student participation. *Journal of Higher Education* 71(3): 342–62.
- Hammond JA, Bithell CP, Jones L, et al. (2010) A first year experience of student-directed peer-assisted learning. *Active Learning in Higher Education* 11(3): 201–12.
- Hassanien A (2007) A qualitative student evaluation of group learning in higher education. *Higher Education in Europe* 32(2): 135–50.
- Hillyard C, Gillespie D and Littig P (2010) University students' attitudes about learning in small groups after frequent participation. *Active Learning in Higher Education* 11(1): 9–20.
- Hounsell D (2005) Understanding teaching and teaching for understanding. In: Marton F, Hounsell F and Entwistle N (eds) *The Experience of Learning: Implications for Teaching and Studying in Higher Education*, 3rd Internet edition. Edinburgh: University of Edinburgh. Centre for Teaching, Learning and Assessment, pp. 238–57.
- Johnson DW and Johnson RT (1989) *Cooperation and Competition: Theory and Research*. Edina, Minnesota: Interaction Book Company.
- Johnson DW and Johnson RT (2009) An educational psychology success story: Social interdependence theory and cooperative learning. *Educational Researcher* 38(5): 365–79.
- Johnson DW, Johnson RT and Smith KA (1998) *Active Learning: Cooperation in the College Classroom*. Edina, Minnesota: Interaction Book Company.
- Johnson DW, Johnson RT and Smith KA (2007) The state of cooperative learning in postsecondary and professional settings. *Educational Psychology Review* 19(1): 15–29.
- Johnson DW, Johnson RT and Stanne MB (2000) *Cooperative Learning Methods: A Meta-Analysis*. The Cooperative Learning Center, The University of Minnesota (electronic version). Available at: <http://www.ccsstl.com/sites/default/files/Cooperative%20Learning%20Research%20.pdf>
- Kelly R and Fetherston B (2008) Productive contradictions: Dissonance, resistance and change in an experiment with cooperative learning. *Journal of Peace Education* 5(1): 97–111.
- Kember D (1997) A reconceptualisation of the research into university academics' conceptions of teaching. *Learning and Instruction* 7(3): 255–75.
- Kember D (2003) To control or not to control: The question of whether experimental designs are appropriate for evaluating teaching innovations in higher education. *Assessment & Evaluation in Higher Education* 28(1): 89–101.

- Kember D, Charlesworth M, Davies H, et al. (1997) Evaluating the effectiveness of educational innovations: Using the study process questionnaire to show that meaningful learning occurs. *Studies in Educational Evaluation* 23(2): 141–57.
- Lassenen B (2012) *Student Approach to Learning – An Empirical Investigation of Factors Associated with Student Approach to Learning*. PhD dissertation. Aarhus: Aarhus University.
- Lea SJ, Stephenson D and Troy J (2003) Higher education students' attitudes to student-centered learning: Beyond 'educational bulimia'? *Studies in Higher Education* 28(3): 321–34.
- Machemer PL and Crawford P (2007) Student perceptions of active learning in a large cross-disciplinary classroom. *Active Learning in Higher Education* 8(1): 9–30.
- Marton F and Säljö R (2005) Approaches to learning. In: Marton F, Hounsell D and Entwistle N (eds) *The Experience of Learning: Implications for Teaching and Studying in Higher Education*, 3rd Internet edition. Edinburgh: Centre for Teaching, Learning and Assessment, University of Edinburgh, pp. 39–58.
- Meyer KR (2009) *Student classroom engagement: Rethinking participation grades and student silence*. PhD Thesis, Ohio University, USA.
- Millis BJ and Cottel PG (1998) *Cooperative Learning for Higher Education Faculty*. Phoenix, Arizona: Oryx Press.
- Nunn CE (1996) Discussion in the College Classroom: Triangulating Observational and Survey Results. *Journal of Higher Education* 67(3): 243–266.
- Onwuegbuzie AJ and DaRos-Voseles DA (2001) The role of cooperative learning in research methodology courses: A mixed-methods analysis. *Research in the Schools* 8(1): 61–75.
- Petress K (2006) An operational definition of class participation. *College Student Journal* 40(4): 821–3.
- Phipps M, Phipps C, Kask S, et al. (2001) University students' perceptions of cooperative learning: Implications for administrators and instructors. *Journal of Experiential Education* 24(1): 14–21.
- Pritchard A and Woollard J (2010) *Psychology for the Classroom: Constructivism and Social Learning*. London and New York: Routledge.
- Race P (2005) *Making Learning Happen: A Guide for Post-Compulsory Education*, 1st edn. Thousand Oaks, CA/London: SAGE.
- Rocca KA (2010) Student participation in the college classroom: An extended multidisciplinary literature review. *Communication Education* 59(2): 185–213.
- Roseth CJ, Johnson DW and Johnson RT (2008) Promoting early adolescents' achievement and peer relationships: The effects of cooperative, competitive, and individualistic goal structures. *Psychological Bulletin* 134(2): 223–46.
- Schafer JL and Graham JW (2002) Missing data: Our view of the state of the art. *Psychological Methods* 7(2): 147–77.
- Shadish W, Cook T and Campbell D (2002) *Experimental and Quasi-Experimental Designs for Generalized Causal Inference*. Boston: Houghton Mifflin Company.
- Sidelinger RJ and Booth-Butterfield M (2010) Co-constructing student involvement: An examination of teacher confirmation and student-to-student connectedness in the college classroom. *Communication Education* 59(2): 165–84.
- Slavin RE (1996) Research for the future. Research on cooperative learning and achievement: What we know, what we need to know. *Contemporary Educational Psychology* 21: 46–69.
- Springer L, Donovan SS and Stanne ME (1999) Effects of small-group learning on undergraduates in science, mathematics, engineering, and technology: A meta-analysis. *Review of Educational Research* 69(1): 21–51.
- Tabachnick B and Fidell L (2007) *Using Multivariate Statistics*, 5th edn. Boston: Pearson Education.
- Trowler V (2010) *Student Engagement Literature Review*. York: Higher Education Academy.
- Vreven D and McFadden S (2007) An empirical assessment of cooperative groups in large, time-compressed, introductory courses. *Innovative Higher Education* 32(2): 85–92.
- Waite S and Davis B (2006) Developing undergraduate research skills in a faculty of education: Motivation through collaboration. *Higher Education Research and Development* 25(4): 403–19.

Weaver RR and Qi J (2005) Classroom organization and participation: College students' perceptions. *Journal of Higher Education* 76(5): 570–601.

Author biography

Kim J Herrmann is a PhD scholar of higher education research at the Aarhus University, Denmark. His research interests are tutorial interaction, student approaches to learning, and cooperative learning. *Address:* Centre for Teaching and Learning, Aarhus University, Denmark. [email: kh@clu.au.dk]