Applying constructivist principles to the teaching of psychology

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Abstract
The legacy and sustainability of a university education requires student independence and ownership of learning. We present data and illustrations to show that adopting a student-centred constructivist approach to teaching and learning allows students to develop a web of self-constructed, interconnected understanding, and supports their development into lifelong learners. In the context of a series of academic skills tutorials for first-year psychology students, the tutorial materials, activities and teaching techniques were rated as more useful when delivered using constructivist principles. The use of constructivist techniques also enabled students to make larger gains in their essay grades over the course of the academic year.

Keywords
Constructivism, scaffolding, peer collaboration, student-centred learning, sociocognitive conflict
1. Introduction

A central aim of higher education is to engender in students an independent, lifelong approach to learning. This requires the student to fully invest in the learning process, and take ownership of their learning and development. As neatly argued by Chickering and Gamson (1987, p. 3), “learning is not a spectator sport”.

A constructivist approach to education centres around the learner’s individual construction of understanding, using support from teachers and peers. In the context of education, the cognitive developmental theories of Lev Vygotsky and Jean Piaget, both examples of constructivist epistemology, have been used to inform instructional design and assessment.

For example, for Piaget, peer collaboration can be a useful source of learning, whereby two peers with conflicting perspectives on a topic experience what is termed sociocognitive conflict, and then work together to reach a common understanding (Davis & Winstone, 2011). This paper focuses on one particular use of constructivist principles: to scaffold students in the transition to university-level study through a programme of academic study skills tutorials in the first year of their psychology degree.

For Vygotsky, learning is an inherently social process, where knowledge and understanding are co-constructed through social interaction (Davis & Winstone, 2011). Indeed, according to Vygotsky, all knowledge exists intermentally (possessed between people) before it is internalised and possessed intramentally by the individual. Interaction between the learner and others in their educational environment allows them to traverse their zone of proximal development, moving from what they are currently able to do to what they have the potential to do through interaction and guidance. The guidance that allows the learner to reach this higher level is termed scaffolding (Bruner, 1983).

Scaffolding is a process whereby structured guidance is provided that allows the learner to reach a higher level of understanding or competence; it can subsequently be taken away and the learner is able to achieve that level independently. From an instructional point of view, this means tailoring teaching to involve learner-generated advances in understanding, by providing the environment within which learners can reach new levels of understanding, without being prescriptive and providing all the answers.
Within higher education, Vygotsky’s principles remind us that there is a difference between what students can do independently and what they can do with structured guidance. We should aim all teaching and learning activities not at what they can do, but what they can do if provided with effective support from scaffolding. Teaching should support them in reaching a new level of competence, but the advance has to come from them, in order to build personal and academic self-efficacy. Thus, teaching methods become much less directive; teachers need to learn how to guide learners towards understanding, not tell them the things they need to understand. For example, case studies are an effective constructivist teaching tool as their exploration allows students to reach conclusions about the material that have been self-constructed through critical analysis (e.g. McDade, 1995; Sudzina, 1997). Problem-based learning has also been framed as a way of enabling students to traverse their zone of proximal development (Harland, 2003), and there are reports in the literature that higher education institutions have effectively implemented a scaffolding approach to both teaching and assessment (e.g. Murtagh & Webster, 2010). The basic principle of providing structured support and guidance whilst allowing the actual advance to come from the student can be applied to any aspect of higher education, from basic study skills to dissertation supervision, and even in written feedback on assignments (e.g. “You have done X well, and you have obviously thought about Y. Now think about how you could improve Z. Why would this be an important part of communicating your ideas to your reader?”).

In our undergraduate and postgraduate taught programmes in psychology at the University of Surrey, we embarked on a project to see to what extent constructivist principles could be used as key organising themes in the ways in which teaching is designed and implemented. The key ideas were that learning activities should involve problems for learners to solve, and that learning is essentially social in nature (Clements & Battista, 1990). As a case study illustrating how this approach has been implemented, and how it is perceived by students, this paper reports findings pertaining to the use of scaffolding in a first-year academic tutorial programme to support the transition to study in higher education.

2. Methods

2.1 Participants

Level HE1 students on the BSc (hons) psychology course are assigned to a small tutorial group at the beginning of their course. Each group has a dedicated academic tutor (a graduate teaching assistant) responsible for marking their coursework essays and providing feedback, and running a series of tutorials on basic academic and study skills, to help students make the transition to university-level study. Tutorials cover topics such as essay writing, critical evaluation, citation and referencing skills, presentation skills, reading journal papers and writing research reports.
Of the six academic tutors who deliver the programme each year, three had worked on the programme for two consecutive years. In order to control for individual teaching style, student evaluations of the tutorials were analysed only for those students from two subsequent cohorts taught by one of the tutors that worked on the programme over both years; 78 students from a cohort that were not taught using scaffolding techniques, and 47 students from the subsequent cohort who were taught using scaffolding principles. As these were anonymous feedback forms, details of participant age and gender are not available. The University Ethical Guidelines permit the analysis of student evaluations for purposes of pedagogical research.

2.2 Design

Student ratings of various components of the tutorial programme were compared between two cohorts. The first cohort of students attended the course of tutorials before the use of scaffolding was incorporated into the course. The second cohort of students were the first to experience the new constructivist emphasis. As a key part of the reorganisation of the course to incorporate constructivist principles was an emphasis on the social nature of learning, the size of each small tutorial group was cut from around 12 students to around 7 students. It was felt that this would better facilitate the student-activating discussion that was to form a key part of the way in which the course was run.

By the very nature of the tutorial programme, there are many factors that could have varied between the two cohorts. However, whilst it was not possible to control every aspect of the tutorial process, the key variables (e.g. teaching style of the individual tutor, topics to be taught) that could have an impact on the outcomes we were interested in were controlled. Both cohorts were taught by the same tutors, had the same number of tutorials, and covered the same topics. The only key differences between the two cohorts were the group size and the way in which the material was delivered; either with or without scaffolding techniques.

2.3 Materials

Each student followed a course of 20 academic tutorials over the course of a single academic year. These tutorials involved preparation for and feedback on coursework essays, as well as study skills. At the end of the academic year, students were asked to provide feedback on their experience of the tutorial programme using a specially-designed feedback form. This feedback form asked students to rate how useful they found the tutorials overall, on a scale from 1 (not at all useful) to 5 (very useful). Other aspects of the tutorials that were rated were the teaching techniques used by their tutor, the size of the group, the use of group work and group discussions, practical exercises, and handouts. The return rate of evaluation forms was 86% for the non-scaffolding cohort and 71% for the scaffolding cohort.
2.4 Procedure

In reorganising the tutorial programme, each aspect of the tutorials was adjusted to embody a constructivist scaffolding approach, such that students were not instructed in study skills but came to develop them through structured guidance. For example, whilst the non-scaffolding cohort learnt about citation and referencing techniques through following a handout that explained formatting in detail, the scaffolding group were given examples of references and citations, and then completed a ‘treasure hunt’ where they were required to find sources and discuss how to provide a citation and reference for each using the basic guidelines they had been given. Similarly, in developing students’ critical thinking skills, the non-scaffolding cohort were given handouts about what critical thinking entails and things to look for when reading sources. The scaffolding group developed critical thinking skills through the analysis of case studies and discussion of research papers, guided by their tutor. Thus, the techniques, discussions, activities, exercises and handouts were all restructured to incorporate the necessary guidance students would need, without providing all the information.

3. Results

The ratings for the usefulness of each component of the tutorial programme, out of the highest possible score of 5, were compiled for each cohort. Figure 1 shows the mean ratings for each component of the tutorials, for the non-scaffolding and scaffolding cohorts.

![Figure 1: Mean student ratings (out of 5) for the usefulness of each component of the academic tutorial programme (error bars show 95% CIs).]
The ratings for each component were compared between the two cohorts using independent samples t-tests. The scaffolding group rated every aspect of the tutorials as significantly more useful than the non-scaffolding group (see Table 1).

<table>
<thead>
<tr>
<th>Component</th>
<th>t-test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>$t(117) = 3.42, p = .001, d = 0.54$</td>
</tr>
<tr>
<td>Techniques</td>
<td>$t(118) = 5.55, p &lt; .001, d = 0.87$</td>
</tr>
<tr>
<td>Group size</td>
<td>$t(120) = 4.44, p &lt; .001, d = 0.60$</td>
</tr>
<tr>
<td>Group work</td>
<td>$t(123) = 3.53, p = .001, d = 0.62$</td>
</tr>
<tr>
<td>Discussions</td>
<td>$t(123) = 4.19, p &lt; .001, d = 0.75$</td>
</tr>
<tr>
<td>Exercises</td>
<td>$t(123) = 4.01, p &lt; .001, d = 0.71$</td>
</tr>
<tr>
<td>Handouts</td>
<td>$t(123) = 3.45, p = .001, d = 0.61$</td>
</tr>
</tbody>
</table>

Table 1. t-test results comparing ratings of each component

Whilst students rated the scaffolding approach more favourably, did it actually improve their learning? We also compared the ‘value-added’ to their academic performance, by comparing the average increase in essay grades from the first essay they completed, to the sixth essay they completed, which was the final assignment for the academic year, across the entire cohort (see Figure 2). The non-scaffolding cohort increased their essay marks over the course of the year from an average of 59.81 (SD = 5.70) for their first essay to an average of 64.12 (SD = 4.93) for their sixth essay. The scaffolding cohort increased their essay grades from an average of 60.06 (SD = 5.87) for their first essay to an average of 66.25 (SD = 5.58) for their sixth essay. A 2 (cohort; non-scaffolding and scaffolding) x 2 (essay grade; first and last) mixed ANOVA revealed that whilst both cohorts showed a significant increase in their essay grades over the course of the year ($F(1, 235) = 140.59, p < .001, \eta^2 = .37$), the increase in grades for the scaffolding group was higher than for the non-scaffolding group, as shown by a significant cohort x essay grade interaction ($F(1, 235) = 5.30, p = .02, \eta^2 = .02$).

![Figure 2. Increase in average essay grades for both cohorts (error bars show 95% CIs).](image-url)
4. Discussion

We adopted a constructivist scaffolding approach in the delivery of a series of academic tutorials to first year undergraduate students. Student ratings of the usefulness of the tutorials were significantly higher under the scaffolding approach, compared to the previous cohort of students that received the same programme of tutorials delivered without a scaffolding approach.

The overall usefulness of the tutorials was rated significantly higher by the scaffolding cohort, yet each subcomponent of the tutorials was also perceived as more useful from students’ perspectives when it was delivered using scaffolding techniques. Students rated the group size as more useful when it was smaller, and it therefore makes sense that students felt the discussions within tutorials were more useful where this group size was smaller, under the scaffolding approach. Activities and exercises were also rated as more useful when they involved structured guidance in the scaffolding approach. Students also felt that the handouts were more useful under the scaffolding approach, even though they contained less information, as the goal was that students would generate the information themselves rather than being provided with it explicitly. Teaching techniques were also rated as more useful in the scaffolding cohort than the non-scaffolding cohort, supporting the use of structured guidance rather than directive teaching.

Beyond student ratings, our findings suggest that over the course of an academic year, the use of scaffolding within academic tutorials helps students to make larger gains in their essay writing skills. The content of the tutorials, for example essay writing and critical thinking skills, was the same in both cohorts, yet the scaffolding cohort increased their essay grades to a larger extent than the non-scaffolding cohort. This indicates that reaching a self-constructed understanding of the key principles underlying essay writing, rather than being taught these skills explicitly, better enabled students to apply them to their own essay writing.

Scaffolding approaches can cause anxiety in students, as they can take students out of their ‘comfort zone’ of teacher as expert, and teaching as the filling up of a vessel of knowledge. Furthermore, this approach does not necessarily involve an answer that is ‘right’ and answers that are ‘wrong’, as it is students’ own constructions that are important. The finding that students rate these techniques positively is encouraging, and suggests that if we socialise students into these kinds of techniques early on in their degree, we can develop in students a more independent approach to learning that helps them learn how to learn, thus extending the legacy of higher education beyond the university years themselves. Indeed, as one student in the scaffolding cohort commented at the end of the tutorial programme, “…[the approach used in tutorials] builds your confidence, because you’re the one helping yourself to improve, not someone else doing it for you. It’s like the proverb about either giving a man a fish or teaching a man to fish. Rather than telling me things, you’ve given me the skills to go and teach them to myself!”
5. References


