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Constructivist Learning in University Undergraduate Programmes. Has Constructivism been Fully Embraced? Is there Clear Evidence that Constructivist Principles have been Applied to all Aspects of Contemporary University Undergraduate Study?

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Abstract

This conceptual paper provides an overview of constructivist education and the development and use of constructivist principles in contemporary higher education, outlining constructivism and some specific facets of student-centered learning. Drawing from first-hand experience and using two examples of current university assessment practice, reflective learning, and learning outcomes, the author argues that, despite claims constructivist pedagogical approaches have become normative practice when it comes to assessment processes, constructivism has not been fully embraced. The question ‘is there clear evidence that constructivist principles have been applied to all aspects of university undergraduate study?’ is considered. This is important and significant and should be of concern to all educators who espouse constructivist principles in higher education.

Keywords: Constructivism, Pedagogy, Teaching, Learning, Assessment, Student-centered learning, Learning outcomes, Active-learning, Reflective learning.

Introduction

Almost a quarter of a century ago, Philips (1995), in an extensively cited education research paper, argued that “there is a very broad and loose sense in which all of us these days are constructivists” (p. 5). Since then, student-centered learning and constructivist approaches to teaching have increasingly been emphasized and encouraged by universities globally (Taylor, 2015). As Krahenbul (2016) recently argued: “Constructivism is undoubtedly one of the most influential philosophies in higher education in the twenty-first century” (p. 97). Can educators and managers, therefore safely assume that this philosophy has influenced and impacted the key elements of university education? Is there clear evidence that constructivist principles have been applied to all aspects of university undergraduate study?

Traditional Teacher-Centered Learning

Ernst von Glaserfeld, in a seminal paper argued that “From the beginning of Western philosophy, the knowledge human reason constructs was in some way thought to be related to an independent reality” (1995, p. 41). The positivistic natural science view of learning “that knowledge is nothing more and nothing less than the scientific discovery of an external reality” (Kincheloe, 2005, p. 13)

and that knowledge exists independently of our minds in a fixed state, meant that for many years knowledge was deemed to be something that could be taught via a teacher-centered approach. This behaviorist model of one-way transmission of content; with learners regarded as being ‘empty vessels’ who could be ‘filled up’ with knowledge, involving the teacher or ‘fountain of knowledge’ who delivered, it was conceptualized by Freire (1970) as a ‘banking’ model of education. Factual knowledge was regarded as existing independently of the learner. Teaching was akin to depositing money (knowledge) in a bank (the learner). It was ‘out there’ pre-existing, ready to be discovered or uncovered, taught and learned. Subjectivity, values, individual interpretations of knowledge and interpretive research were regarded as being unscientific. As von Glaserfeld argued, “In the traditional view, schools are seen as institutions that are to impart value-free, objective knowledge to students” (1995, p. 176). Teaching would involve rote learning and coverage of content (Shah, 2019). In a similar vein, Pepin (1998) suggested that “The belief that it is possible for a subject [i.e., learner] to understand and assimilate some precise bit of knowledge which has been mastered by another subject [i.e., the teacher] is, without doubt, the main basis of our customary representation of education” (p. 180).

With a teacher-centered approach, the transmission of pre-existing knowledge is seen as the main process of education and a “corpus of knowledge is established beforehand, which students are to master” (ibid. p. 180). Associated with this behaviorist transmission model of teaching are educational techniques such as lecturing, rote learning, memorizing facts, and assessment (primarily formal closed-book examinations) based on the replication of correct answers and a demonstration of understanding. In this one-way didactic transmission model of knowledge transfer from teacher-to-learner, responsibility for learning lies with the teacher or lecturer. It is not the student’s responsibility to learn; they are passive recipients. It follows that within this paradigm, the teacher teaches and therefore, the learner learns, and “for learners to learn, teachers must teach” (Adams, 2011 p. 29). This didactic approach contrasts markedly with constructivist teaching.

Constructivist Approaches to Learning

Constructivist approaches focus on the learner as being an active participant in the learning process and argue that for learning and understanding to take place, knowledge has to be assimilated by and incorporated into a learner’s existing mental patterns. They must make new mental constructs for themselves. Learners are seen as being actively responsible for their learning as active constructors of their knowledge, not passive vessels to be filled up. The teacher is no longer the sole source of ‘correct’ knowledge but is a facilitator or guide and co-producer of meaning. As Adams suggests, “constructivist discourse denies a simplistic relationship between teacher activity and that which a learner learns” (2011, p. 27) and rejects positivistic assumptions that “the assumption that learning is an internalization of an external reality which predates human cognizing and which sits ready to be discovered and understood” (ibid.).

Kanuka and Anderson (1999) identify two dimensions of constructivist approaches, which lead to four differing positions. The first is a continuum between an understanding of reality as being objective at one end, and a view that reality is subjectively defined at the other. The second dimension is a continuum from knowledge being socially constructed at one end, to knowledge as being individually constructed at the other. This gives four positions: ‘co constructivism’ where knowledge is socially constructed and there is an objective reality, ‘situated constructivism’ where knowledge is socially constructed and there is no objective external reality (i.e., there are multiple realities), ‘cognitive’ or ‘critical constructivism’ where knowledge is individually constructed and there is an objective reality, and ‘radical constructivism’ where knowledge is individually constructed and there are multiple realities (Kanuka & Anderson, 1999, p. 1-6). Socially constructed constructivist learning places emphasis on learning through interaction, discussion, negotiation and sharing. These are pedagogical and andragogical approaches that have been increasingly adopted throughout higher education over the last twenty years and particularly so in the last decade.

Very few people in the field of Educational studies would disagree that the three constructivists

whose work has impacted the most upon pedagogy in schools and andragogy in colleges and universities are Bruner, Piaget and Vygotsky. The majority of their work relates primarily to children's learning. For example, Piaget's (1957, 1958, 1972, 1990) four stages of cognitive development and learning occurring through stimulus and response, assimilation and accommodation, Bruner's (1960, 1961) spiral curriculum and discovery learning and Vygotsky's (1978) Zone of Proximal Development (essentially the difference between the current actual development level of a child and their potential development under adult guidance, or in collaboration with more capable peers) and a belief that knowledge is constructed socially, using language.

Many of their underpinning concepts and beliefs have fed into education and shaped or informed the teaching processes evident in both school and post-compulsory education today and have led to a more student-centered approach to teaching. Bruner's (1960 & 1961) proposition that students are active learners who construct their own knowledge and organize and categorize information using a coding system which is best discovered rather than being delivered or taught led to the 1960's 'discovery learning' movement, with 'learning by doing' and 'active-learning' becoming valid and heavily promoted approaches to facilitating learning, particularly so within the sciences. His work shifted the emphasis of many teachings to include structuring the curriculum to build on and reinforce ideas repeatedly (a spiral curriculum). Bruner's concept of scaffolding (helpful, structured interaction between an adult and a child to help the child achieve a specific goal), emphasized the social nature of learning. Vygotsky and Bruner emphasized language; that it allows for the ability to deal with abstract concepts. Both would later be regarded as being social constructivists: conceptualizing knowledge as being a product of social interaction, interpretation and understanding (Adams, 2006), whereas Piaget's work, with an emphasis on biological and psychological development, would be seen as being a cognitive or critical constructivist approach. Piaget's work laid the foundations for and was a primary influence on constructivist approaches being introduced into compulsory education. It had widespread influence

both on constructivist philosophy and educational policy and practice (Kanuka & Anderson, 1999) and informed von Glaserfeld's (1995) later concept of 'radical constructivism'. Piaget's influence was far and wide-ranging, for example, informing the United Kingdom's Plowden Report (1967) and subsequent major reform of British school education so that it emphasized child-centered learning. Its' often-quoted statement "At the heart of the educational process lies the child" (chapter 2, p. 7) was based on Piaget's theories of child growth and development and his emphasis on the child as an individual learner. Today, as Mayer argued over a decade ago, "constructivism has become the dominant view of how students learn" (2004, p. 14).

Tenets of Constructivism

The basic premise of constructivism is that "meaningful learning occurs when the learner strives to make sense of the presented material by selecting relevant incoming information, organizing it into a coherent structure and integrating it with other organized knowledge" (Mayer, 2003, cited in Mayer, 2004) and that "learning is an active process in which learners are active sense makers who seek to build coherent and organized knowledge" (ibid.). There is considerable evidence of constructivist principles in use within higher education today, and because a range of different methods fall under the broad umbrella term of 'constructivist' or 'student-centered' teaching practices (Baeten et al. 2013) it can be argued, as Meyer does, that "Constructivism can no longer be viewed as an exercise in radical thinking primarily aimed at generating innovative teaching. It has become an integral part of the pedagogic mainstream" (2008, p. 334). Though it is important to note, "constructivist learning theory provides a view on learning and not on teaching" (Baeten et al. 2013, p. 13). This last point is important; constructivist approaches are not about teaching, but about learning. Yet typically in university and governmental statements, the words teaching and learning are used in conjunction. Regardless of the specific dimension of constructivism followed

All positions of constructivism would agree that teaching cannot be viewed as the transmission of knowledge to the unenlightened from the enlightened.

Nor can the learning process be teacher-centered where the student is a receptacle of information (like a 'beaker' that can be filled with information) (Kanuka & Anderson 1999, p. 9).

Student-Centered Learning

The term 'student-centered' learning "can mean different things to different people" (O'Neill & McMahon, 2005, p. 1) but generally, its proponents aim to "break away from the traditional lecturer dominated classroom and to encourage greater student participation and responsibility" (Boyapati, 2000, p. 365). The European Union's highly influential Lifelong Learning Programme identifies the core aspects of student-centered learning as being: innovative teaching, active learning, use of learning outcomes, a system of academic credit accumulation and transfer, flexible curricula and learning paths (Attard, 2010, p. 11-12). Yet, crucially, they identify that there is "difficulty in defining exactly what student-centered learning entails" (ibid.).

Although a precise definition may not be possible, student-centered learning is typically characterized by three features: (1) active involvement of the learners to construct knowledge for themselves, (2) a coaching and facilitating teacher and (3) the use of authentic assignments (Baeten, et al 2013, p. 15). Authentic in this context refers to an approach which allows or requires students to explore, discuss and make meaningful constructs and relationships within contexts that involve working with and using 'real-world' problems and projects that are relevant to the learner and typically are based on actual practice outside of the university environment (Donovan et al. 1999).

Rule (2006) identifies four principles for authentic learning: (1) a focus on practical, lifelike problems that imitate the trade of experts in the field, (2) inquiry-based learning with an emphasis on metacognitive skills, (3) learners' participation in active conversations in a social learning environment, and (4) allowing learners make choices and guide their learning in meaningful, task-oriented work. Others would include an emphasis on deep learning (Holmes, 2018a, 2019), increased responsibility and accountability on the part of the student and a reflexive approach to the process by both the teacher and the

learner (Lea et al. 2003). Student-centred learning involves teaching techniques such as: discovery learning, problem based learning (PBL), hands-on and experiential learning, group discussions, project work, use of learning contracts and reflective learning; all of which form part of a student-centred learning approach in use and are espoused as necessary pedagogical approaches throughout contemporary higher education programmes.

Active Learning

Active learning is a term that many educators are familiar with; however as with student-centered learning, defining it precisely is problematical. McManus identifies, "There is no universally accepted definition of 'active learning'" (2006, p. 1). Although over ten years old, the quotation is still valid today. Active learning is a term that encompasses a range of pedagogical approaches that emphasize learners being actively involved in the learning process rather than being passive recipients of the information. It is typified by a shift from the teacher/lecturer moving from being a source of knowledge to a guide to the process of learning rather than a 'manager of content,' the teacher becomes a facilitator of learning rather than a deliverer of material. Thus, active learning may be viewed as a wholly constructivist approach. One definition is that it is "anything course-related that all students in a class session are called upon to do other than simply watching, listening and taking notes" (Felder & Grant, 2009, p. 2). It may be inferred from this that active learning means many different things to many different people and that it may be easier to identify what active learning is not, rather than what it is. We can, for example, clearly identify that it is not a traditional two-hour lecture or chalk-and-talk exposition. It is an "essentially contested concept" (Gallie, 1956, p. 169), i.e., impossible to conclusively define, but perfectly possible and rational for educators to discuss and justify their holding of one interpretation rather than a competing one.

Common forms of teaching which typify active learning approaches include: learning by doing, group work, debate, co-operative learning, dialogic learning, collaborative work, question and answer

sessions, project-based work; essentially any activity which encourages and allows for student interaction with each other and with the teacher, engagement with the topic and opportunities for reflection and a shift in emphasis on the responsibility for learning moving from the teacher to the learner. Arguably, most university teaching now incorporates a range of active learning techniques, albeit to a varying extent, as the formal lecture is still a predominant teaching method (see, for example, Stearns, 2017, for a discussion of this).

Has Constructivism been Embraced? The use of Reflective Learning as an Example.

One facet of student-centered learning, that of reflective learning, as a means of encouraging students to become actively involved and construct meanings for themselves, is extensively used within the fields of Education and Nursing and is increasingly evident throughout many disciplines. Students are encouraged (or required by assessment processes) to become ‘critically reflective practitioners’ by the time they complete an undergraduate degree. For example, referring to two typical university Education modules, learning outcomes assessed would be ‘to use theory and practice to reflect upon and improve practice’ and ‘to reflect on and critically evaluate experiences.’ Thus, on the face of it, a constructivist approach is in use. The students are encouraged to learn and use a model of reflection, such as Brookfield’s (1995) four lenses or Schön’s (1983) reflection in and on action, along with critical incident recording, to reflect on their own learning and development, actively constructing meaningful and relevant personal knowledge, which they are then able to use to draw conclusions and apply the new knowledge within their practice (as for, example a trainee teacher, or nurse). Therefore, it may be argued that constructivism and student-centered learning is in use and embedded within existing structures and assessment protocols in university education in these two fields. Yet is it? On a surface level, yes. University lecturers use active learning techniques when teaching, yet the teacher-centered lecture delivery is still seen both students and academics as being the prime method of teaching (Smith and Valentine, 2012) and is enshrined in

university terminology: the lecturer, the lecture theatre, the lecture series. Universities do aim and want or claim to want their learners to be independent, autonomous and active learners (Holmes, 2018b). Yet, crucially, that has to be within the parameters of what the academics, define and articulate as being relevant knowledge. The lecturer is still seen by the undergraduate learner as the source of ‘correct’ knowledge; learners are not always able to value, trust, or even to believe their own constructed knowledge. And this may be due to a range of factors including the power relationship between lecturer and learner, students’ lack of confidence in their abilities, and many years of experience of more behaviorist oriented teaching within the compulsory school education sector when they were younger. The academic is seen as the expert provider; students do not always trust and believe their view, they frequently want, and need, the lecturer’s expertise to provide reassurance and guidance. This is typified by a conversation the author recently had with a third-year undergraduate student, who stated, *“I don’t know if I am doing this reflection business right. I am reflecting, learning and putting things into practice at work and making changes in the way I do things; but I don’t know if I’m doing the right things the right way when I reflect and with the conclusions, I make from the reflection, or if I’m learning the right things. How do I know that what I think and conclude is correct?”*. The author inferred from this that the student was engaged in authentic learning and making meaningful constructs, but that they did not have the confidence to believe or trust their new knowledge constructs. They needed the reassurance provided by the lecturer (perhaps what Bruner would have referred to as a ‘more knowledgeable other’). The student needed a more knowledgeable other to, in effect, ratify or confirm that the conclusions they had drawn were accurate and correct. This does not mean to say that constructivist principles have not been embraced, yet is perhaps a reminder that constructivist theory is about learning, not teaching. However, when we look at assessment processes, specifically the use of learning outcomes, it may be seen that constructivist principles may have been abandoned or ignored.

Has Constructivism been Fully Embraced? The use of Learning Outcomes in Higher Education as an Example.

One facet of constructivist student-centered learning is that students should be involved in deciding how to evidence their learning and participate in its evaluation (O'Neil & McMahon, 2005). Over the last two decades, there has been a considerable shift towards the use of pre-specified learning outcomes within modularized credit-based higher education programmes (Holmes, 2019) to the extent that the considerable majority of university programmes throughout the world use learning outcomes. Their use should allow students to be able to provide a range of evidence to demonstrate achievement of an outcome (Otter, 1992) as Attard argues, "With the use of learning outcomes the focus shifts from what the teacher is able to teach to what the achievements and level of understanding of the student are expected to be" (2010, p. 12). Gibbs, along with many others, argues that learning outcomes empower students because they are not content-based but outcome-based (Gibbs, 1995). To an extent, this happens; outcomes may be based on transferable/professional/practical skills rather than subject knowledge (yet always underpinned by relevant academic theory). O'Neil and McMahon identify that the practice of writing learning outcomes is "an example of the move towards student-centered learning in the curriculum and helps to shift the emphasis on the learner as opposed to a coverage model by the teacher" (2005, p. 5). But does it? A constructivist approach should allow some, perhaps all, of the learning outcomes to be changed for different learners and allow them to negotiate and agree on their outcomes, thereby making the learning experience more meaningful and relevant (Holmes, 2019). What is very apparent throughout current higher education practice globally is that the assessment of learning outcomes requires the learner to demonstrate achievement of outcomes that have been determined in advance by the academic, not by the learner (*ibid.*). The learning outcomes are pre-specified. The assessment is devised by the academic, often months in advance of a module being taught, then is typically approved by an academic approvals committee or external examiner. It is often little or no real consideration

was given during this process to the specific cohort of learners and their existing knowledge, nor the individual learner within a cohort. Effectively, at this stage, constructivist principles are not embraced. They would seem to be disregarded. And this is seemingly regardless of whether a student being actively engaged and suggesting their assessment may lead to improving their interest, knowledge and understanding of the subject (Holmes, 2019). Almost thirty years ago, Merrill (1991) suggested that a constructivist approach would necessarily argue that specific learning outcomes are not possible because knowledge and meaning are constructed individually by and are unique to each learner. Yet higher education has embraced and integrated learning outcomes. Learning outcomes and their assessment frequently dominate the curriculum and distort it (Torrance, 2007) so that learning outside the parameters of the outcomes is disregarded or ignored (Torrance, 2012, Holmes, 2019) by some learners. It follows that using pre-specified learning seriously undermines progress in utilizing constructivist learning approaches. The author argues it is not the use of learning outcomes per se, but the way that learning outcomes are used, that is antithetical to constructivist approaches.

Summary and Concluding Remarks

The two examples provided, reflective learning and pre-specified learning outcomes demonstrate that although universities have adopted student-centered and active-learning pedagogies, it is highly debatable whether constructivism and constructivist principles have been fully embraced in assessment processes.

The question examined was, 'is there clear evidence that constructivist principles have been applied to all aspects of university undergraduate study?'. As has been demonstrated, there is evidence to the contrary. Universities and university educators have embraced constructivism yet not fully embraced it in respect to learning outcomes. As Lea identified in 2003, "many institutions or educators claim to be putting student-centered learning into practice, but, in reality, they are not" (2003, p. 322). There has been a notable increase in the adoption of constructivist approaches to learning since then, yet with assessment practices,

and specifically the use of pre-specified learning outcomes, there is less evidence of constructivism in use. The author has argued that there has been a shift towards constructivist education, from teacher-centered to learner-centered education and that over the last twenty or so years universities and university educators have increasingly embraced constructivist principles, yet that when it comes to the assessment of learning outcomes, constructivism would seem to be disregarded. If educators wish to fully embrace constructivism, they should consider how constructivist principles are implemented throughout all aspects of the teaching, learning and assessment protocols and processes in use.

Higher education has adopted and implemented many aspects of constructivism, yet has not fully embraced it in respect of the assessment of pre-specified learning outcomes. Should universities, therefore, genuinely claim that they use constructivist approaches to learning? Yes, they may. But should they claim that they have fully embraced constructivism? No, they should not do so.

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