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Chapter

Signature Pedagogies in Vocational Learning

Janet Hobley

Abstract

This section will look at differing concepts of pedagogy using research data collected at a college that is at the forefront of using technology as a tool for learning. The data collected was originally analysed using the concepts of Pedagogical Content Knowledge (PCK), Technological Pedagogical Content Knowledge (TPCK), Signature Pedagogies and expansive vocational education to see how these concepts applied to practice. The research indicated that whilst there were differences in the pedagogical content approach, the concept of signature pedagogies was strong across all the vocational curriculum areas looked at. It highlighted several instances where the teachers were using an ‘implicit structure’ in their pedagogy to draw out the moral aspects of the profession and the inherent principles that guide a professional in a particular field. Finally, it confirms that through using signature pedagogies teachers are able to develop habits of the heart, mind and hand in their learners and to cultivate learners who ‘think like professionals’.

Keywords: pedagogical content knowledge, technological pedagogical content knowledge, signature pedagogies, expansive education

1. Introduction

This chapter investigates the relationship of varying pedagogical definitions alongside observations of teaching practice within different vocational areas. These pedagogical concepts include Technological Pedagogical Content Knowledge (TPCK), Signature Pedagogies and expansive vocational education. Originally Shulman [1] defined pedagogy in distinct ways that incorporated concepts such as Content Knowledge (CK) and Pedagogical Content Knowledge (PCK) and both relate to both academic and vocational pedagogy. However, for now the emphasis is on a consideration of signature pedagogies in vocational learning and its importance in professional learning.

2. Vocational pedagogies

According to Shulman [2] Content Knowledge arises from the knowledge of the discipline being taught and here he uses the example of Biology as the subject in question. In terms of teaching, he raises some interesting questions such as “How does the novice teacher (or even the seasoned veteran) draw on expertise in the subject

matter in the process of teaching?” (p. 8). Ultimately this is about the amount and organisation of knowledge that the teacher has. Pedagogical Content Knowledge on the other hand refers to the way that the teacher organises specific topics and ranks them according to difficulty in learning. In this way he or she is able to build up a coherent scheme of work that builds knowledge and scaffolds it so that it becomes more accessible to learners. Here Shulman means the most frequently taught topics and the most accessible forms of representation and illustrations of that topic, again with the desire to make it more accessible to learners. In the past these would have been ‘cut and pasted’, photocopied and reproduced for the learners, nowadays the internet has allowed a different form of cut and paste. Hence in the light of technology Shulman’s original definitions of teacher knowledge have been revised and here a different dimension has been added to these concepts, that of Technological Pedagogical Content Knowledge (TPCK). Several authors (Koehler and Mishra [3] and Harris et al. [4]) discuss this concept and define the term as the effective use of technology in teaching and learning. Here it assumes that a teacher has some technical content knowledge, that is some knowledge of technology available to teaching as resources to illustrate and represent topics. Here the Content Knowledge, and PCK as advocated by Shulman come together as Technological Content Knowledge in other words, the knowledge of how technological aids can enhance these representations. However, this is all very well if the technology also aids pedagogically or if it is chosen just because it is there. Here the new concept of TPCK presents different challenges to teachers today.

3. Technological pedagogical content knowledge

TPCK can be viewed as the basis of good teaching with technology and requires an understanding of the way concepts can be represented through using emerging technologies and by using the correct pedagogical principles that use that technology in a constructive way to allow access to content. This is different for example than knowing that Padlet is an ‘app’ (application), it also involves cognition as to how this technology can help in pedagogical ways as well. Here Padlet can be used in collating student ideas and as collaboration in learning. It allows a more student-centred approach to construction of knowledge and hence application and analysis of that specific subject knowledge.

4. Signature pedagogies

However more recently another concept of pedagogy has emerged in the literature, that of ‘signature pedagogies’ which is defined as “types of teaching that organise the fundamental ways in which future practitioners are educated for their new professions” Shulman [1]. This concept is of particular importance in a vocational context as here students are being prepared for specific professional careers such as Hairdressing, Engineering and Construction amongst others. Recent literature has revolved around the concept of vocational pedagogies and how students in vocational education and training are taught differently from more academic courses based on theory alone. As a concept signature pedagogy is an idea that Shulman [1] applied to vocational areas of learning and noted here that the learner is ‘trained’ in three areas of the professional work involved. These are:

- Thinking as a professional
- Performing as a professional
- Acting as a professional

Shulman [1] goes on to note three dimensions to signature pedagogy, these being 'surface structure', 'deep structure' and an 'implicit structure'. The surface structure he argues is the operational aspects of teaching and learning such as questioning students and demonstrating specific techniques important to those professions. In Hairdressing these would be demonstration of specific skills such as cutting hair and for example in Engineering, underpinning health and safety around the correct use of large lathes. The deep structure involved a set of assumptions about how to impart the specific knowledge within that profession and again in Engineering, this would be how to solve problems and find solutions. Finally, the implicit structure according to Shulman involves the moral aspects of that profession such as attitude, values and dispositions. Here he uses law as an example of legal reasoning and moral judgements.

Lucas and Hanson [5], as does Shulman, go one step further and refer to signature pedagogies as defining habits of hearts, mind and hands. Shulman [1] notes "One thing is clear: signature pedagogies make a difference. They form habits of the mind, habits of the heart, and habits of the hand". For Lucas and Hanson these habits of mind can be described in Engineering as EHoM (Engineering Habits of Mind) and this involves as the following:

- Systems thinking (seeing whole, systems and parts, and how they connect, pattern-sniffing, recognising interdependencies, synthesising)
- Problem finding (clarifying needs, checking existing solutions, investigating, contexts, verifying)
- Visualising (move from abstract to concrete, manipulating materials, mental rehearsal of physical space and of practical design solutions)
- Improving (relentlessly trying to make things better by experimenting, designing, sketching, guessing, conjecturing, thought-experimenting, prototyping)
- Creative problem solving (applying techniques from other traditions, generating, ideas and solutions with others, generous but rigorous critiquing, seeing engineering as a "team sport")
- Adapting (testing, analysing, reflecting, re-thinking)

Lucas and Hanson [5] conclude that those involved in engineering teaching and learning need to consider redesigning engineering education and start from the premise that they are trying to "cultivate learners who think like engineers, and we have suggested that a clearer articulation of the signature pedagogies of engineering may support this aim." (p. 12).

Whilst not within an engineering context Claxton [6] too refers to Habits of mind as specific skills and attitudes to learning such as "resilience, creativity, communication, team working, leadership, flexibility, resourcefulness, reflection and metacognition"

(p. 6). Lucas et al. [7] also use the term 'expansive education' as a means of redefining vocational or 'real-world learning' and here we see terms such as resourcefulness, self-belief and 'wider dispositions for lifelong learning' (p. 138). Lucas et al. [7] go onto unpick this concept further to look at the part that the teacher has on learning, through being 'feedback-rich' (p. 133). By this they mean 'critical reflection on progress' and how feedback provides learning with purpose and progression.

It is clear from the literature that signature pedagogies make a difference and as Shulman noted in 2005, they inform habits of the mind, heart, and hands. It follows therefore that teachers need to use these more in vocational learning to enable students to think like professionals with resilience and resourcefulness at the heart of what they do. The following section therefore looks to practice to see how vocational teachers do use signature pedagogies in practice.

5. Methodology of research

In order to research the way that vocational teachers integrate the concepts of signature pedagogies into their day-to-day teaching, data was taken from a series of classroom observations within a vocational college in the Southeast of England. Staff here are routinely observed either within a theory classroom-based lesson or in a practical workshop involving skill-based learning. Observations are part of the quality assurance process and are recorded as a narrative report rather than a tick box approach. These are not graded but teachers are given specific targets for improvement based on what was observed in that session. Data was collected over two academic terms and here both practical and theory sessions were observed. There were 13 lessons observed in total, of these 11 were theory-based sessions with 2 practical ones. The vocational subjects seen were a Construction practical session, two Hairdressing sessions, one practical and one theory based. The other observations came from Engineering, two different theory lessons, Gas, two theory lessons, two Health and Social Care theory lessons, two Media theory sessions and two Plumbing theory sessions. All teachers seen were experienced in their vocational subject having been practitioners first and teachers later in life. In terms of demographics most were middle aged and had been teaching for several years. The Hairdressing and Health and Social Care teachers were female as was one of the Engineering teachers. The Media sessions was split between one male and one female and here the female teacher was a novice teacher in her first year of teaching having spent some years in broadcasting. All the Gas, Construction and Plumbing teachers were male. The observations were written up in full and comments were extracted from the observation feedback and analysed according to the following concepts relating to signature pedagogies in both practical and theory lessons. These were:

- a surface structure – where there was a reference to teaching methods
- a deep structure – where there was a reference to specific professional learning
- an implicit structure – where there was a reference to the moral or value judgements of that profession

Using this data allowed an overall view of how signature pedagogy is incorporated in teaching of vocational learning. The following section outlines the findings of the observed sessions.

6. Findings

Table 1 shows the thirteen sessions observed with a breakdown of theory or practical. The comments in column two have been extracted from the full observation feedback as they show aspects of signature pedagogy. Column three shows the analysis of the comment in the light of Shulman's [1] dimensions of signature pedagogy, these being surface/deep/implicit. All lessons observed showed deep or implicit dimensions of signature pedagogy in practice, these being references to specific professional learning or moral or value judgements.

Vocational subject	Observation comment that relates to the way that the teacher is demonstrating signature pedagogies	Dimension: surface/deep/implicit
Hairdressing theory lesson 1	Wonderful, you talked about training as a hairdresser rather than just passing the exam. Good demonstrations seen that helped the learners to see a professional in practice.	Deep
Hairdressing practical lesson 2	Whole group is managed well and there is a brisk pace which is reinforced with reference to 'hairdressing pace', excellent standards required here	implicit
Engineering theory lesson 1	Reinforcement of key rules such as the need for the equation, excellent practice for their future as engineers.	deep
Engineering theory lesson 2	Here the project was linked to the real world of project management and the skills needed here (S). Linked to money and budgets as well. Well done.	Deep/implicit
Health and Social Care theory lesson 1	Made relevant to the real world of work and what they want to do in the future.	deep
Health and Social Care theory lesson 2	The topic was linked well to being a professional and the need for CPD, formative assessment via using whiteboards, here students write their ideas about how to complete CPD	deep
Gas theory lesson 1	The topic was gas decommissioning, and it began with consideration of the Duty of Care involved in any gas work undertaken. Excellent analogy provided which clearly highlighted the need to refer work that was not safe to the correct person/authority (S). This really showed the students the importance of never leaving work with a possible gas leak. This was reinforced with the legislation (RIDDOR) and the need to report any gas leaks immediately. The major strength seen here was the constant reference to the professional approach that needs to be taken when dealing with gas. This was done through the repeated reference to Duty of Care and the possibility of killing someone if gas explodes!	implicit
Gas theory lesson 2	Excellent use of own experiences and local knowledge with regard to the damage gas fires can do and you respond well to student questions here as well. You made it relevant to the exam that the students need to take and above all a strength here was the constant reference to the professional approach needed with regard to Duty of Care and the possibility of 7 years for manslaughter. This was reinforced several times as was the competence required for different equipment and ongoing need to continuous professional development as a gas engineer.	implicit

Construction practical lesson 1	Excellent use of humour and how to learn from mistakes and to move on. All this is good grounding for professional practice. Students rated this and it was then made clear to them as to the importance of this technique as practice for being a master craftsman. Well done here, this showed the need for a professional approach to the trade.	implicit
Plumbing theory lesson 1	Discussion then moved to being a professional, although you did not mention this word. You did note the need for CPD and the regulations for renewal of the card at 5-year intervals.	Implicit/deep
Plumbing theory lesson 2	This was also well related to actual work as a plumber and you made good use of a past student to illustrate key points	deep
Media theory lesson 1	However, it was a useful exercise as it allowed you to evaluate the brief as well as being a chance to emphasize the need for some practical procedures that they would need in industry, this part was excellent as it really linked to the world of work	deep
Media theory lesson 2	This was also related to merit/distinction etc and again related to which area of the industry they might like to focus on in future. Logbooks were related to interview skills and you made it clear that even if they did not like doing them, they needed to! Linked to Btec rules of working with more than one person and again to real work ie getting a script and being creative.	deep

Table 1.
To show the observation data analysed in terms of the way that vocational teachers use signature pedagogies in practice.

7. Discussion

Interestingly the strongest lessons showing aspects of an implicit structure for a signature pedagogy came from the plumbing and construction teams. This was seen as implicit due to the references concerning health and safety and craftsmanship. There were three lessons observed in this department, two theory-based lessons and one practical. Clearly the issue of dealing with a potential gas hazard can be considered as a moral judgement as did the comment made about being a master craftsman. In these instances, the teachers were drawing on their own experience as master craftsman to highlight the professional aspects of their trades. The comment regarding a 'hairdressing pace' was seen in a practical session in which the teacher was getting the learners to work at a pace appropriate to a real hairdressing salon even though they were still training. A point worth making here is that both gas and hairdressing involve working directly with customers and that in both health and safety is vital to a professional approach.

The lessons which were deemed to show deep structures rather than implicit ones were because they did not touch on the moral aspects of the craft but rather were aspects of specific knowledge relating to that subject. Here there were several references to the real world of work and being a professional. Here as well the teachers were modelling good practice as in for example, the hairdressing teacher who was demonstrating techniques in a professional way so as to enable students to observe a professional person in action. This resonates with Claxton's [6] ideas of habits of mind

where teamworking, creativity and communication are important skills required for that profession.

To some degree it can be argued that in Engineering there were elements of habits of mind as the reference to the need for 'equation' does highlight the need for students in this discipline to be able to visualise or 'move from abstract to concrete' as Lucas and Hanson [5] indicate as being an EHoM for this subject. Finally, it is clear from all the observations undertaken that there were deep structures of teachers using signature pedagogies as part of professional vocational learning.

8. Conclusion

To return to the literature, Shulman [1] applied the concept of signature pedagogy as one in which the learner is 'trained' to think, perform and act like a professional. The outcome he argued, would be that through the implicit structure of the pedagogical approach, learners would gain the valued dispositions for that profession. From this data it can be seen quite clearly that the vocational staff involved in teaching students today do use signature pedagogies in their day-to-day teaching, both in theory and practical sessions. The repeated reference to Health and Safety in working with gas was reinforcing the moral judgements that a professional must exercise at all times, the implicit structure that Shulman claims is part of signature pedagogy. Similarly, reference to the 'pace of hairdressing' shows how the trained professional must act and perform when working on real clients.

In terms of cultivating the habits of mind, heart and hand, there is evidence that the teachers were developing these by role modelling as seen in hairdressing, learning from mistakes as seen in the practical construction class and reinforcement of the 'rules of equation' seen in engineering. Unfortunately, the EHoM that Lucas and Hanson [5] refer to was not really seen in the data, this is intended to be further research within this particular vocational area in the future.

Conflict of interest

The authors declare no conflict of interest.

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