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Scaffolding and learning: its role in nurturing new learners

I. Verenikina
University of Wollongong, irina@uow.edu.au

Chapter 10

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Irina Verenikina

Introduction

Recently created NSW Institute of Teachers (NSWIT) put the quality of teaching at the top of its agenda. The Framework of Professional Teaching Standards emphasises the importance of teachers' effective communication with their students (NSWIT 2006, pg3). The importance of teacher - student communication in learner's achievements is strongly emphasised in the socio-cultural educational theory, originated by Lev Vygotsky (1978) and further developed in modern research (Daniels 2001). This theory describes the process of teaching and learning as "much more than face-to-face interaction or the simple transmission of prescribed knowledge and skills" (Daniels 2001, pg2) but rather places stress on dialogue and co-construction of knowledge (Wells 1999). It describes teaching as strongly influenced by, and embedded in its social and cultural context and points to the meaning of teaching as the transformation of socially constructed knowledge into that which is individually owned by the learner. This type of teaching assumes a specific paradigm of teacher-student interaction where the role of the adult is that of collaborator and co-constructor. A strong emphasis is on the active position of the learner, which is essential for the development of the life-long learning skills.

Australian (NSW and Queensland) Government documents on Quality Teaching and Productive Pedagogies (2001) are largely inspired and influenced by socio-cultural theories of teaching and learning. The documents emphasise the important "role of student direction in learning, where students influence the nature of the activities they undertake and assume responsibility for the activities with which they engage" (Productive Pedagogies, 2001). Self-directed learning is a significant part of the development of students' positive attitudes towards life-long learning, which the Commonwealth Government Quality Teacher Initiative (2000) views as a key element in the recognition of quality teaching. More recently, achieving high standards of primary and secondary education has been associated with "promoting education for further education and training, work and lifelong learning" (BOS NSW, 2007, p.15). Thus, self-directed, life-long learning has been perceived as an important aim of quality teaching. To achieve this goal teachers have to engage in effective communication with their students which includes "a repertoire of inquiry techniques and teaching strategies as well as the ability to use a range of tools, activities, and resources to engage their students in learning" (NSWIT 2006, pg3). A well known practical implication of Vygotsky's theory, the metaphor of scaffolding, which is

used to capture the nature of support and guidance in learning, can assist teachers' understanding and developing of such techniques.

Over the past two decades, a large number of educators and researchers have used the concept of scaffolding as a metaphor to describe and explain the role of adults or more knowledgeable peers in guiding children's learning and development (Stone 1998; Krause, Bochner& Duchesne 2003; Hammond 2002; Daniels 2001). Teachers find the metaphor appealing as it "resonates with their own intuitive conceptions of what it means to intervene successfully in students learning" and "offers what is lacking in much literature on education - an effective conceptual metaphor for the quality of teacher intervention in learning" (Mercer 1994, in Hammond 2002, pg2). As pointed out by Stone, it "highlights one of the key features of children's learning, namely, that it is often guided by others, who strive (explicitly or implicitly) to structure learning opportunities" (1998, pg 358).

The metaphor of scaffolding has been applied to a number of learning areas. For example, O'Toole & Plummer (2004), Siemon & Virgona (2003) and Clarke (2004) studied the characteristics of scaffolding in mathematics lessons. Dixon-Krauss (1996), Devlin (2000), Donovan & Smolkin (2002) and Kong (2002) explored different aspects of scaffolding in teaching reading and writing. Hammond (2002) analysed the role of scaffolding in teaching English as a second language. An increasing number of researchers apply the metaphor to teaching technology (eg Savery & Duffy 1996; Merill 2002). General characteristics of scaffolding across KLAs have been also discussed (Stone 1998; Jacobs 2001; Rasmussen 2001 etc).

However, due to its diverse interpretations (Hammond 2002), scaffolding does not provide educators with clear and definite guidelines on the ways that it should be used to achieve successful teaching. In fact, it appears to become an umbrella term for any kind of teacher support (Jacobs 2001). Furthermore, due to the metaphoric nature of the term, which implies "a view of the adult as moulder of passive child" (Stone, 1998, pg 362), scaffolding tends to be interpreted as a variation of direct instruction. Consequently, when taken out of its theoretical context, it loses the richness of the original meaning implied by socio-cultural theories and invalidates Vygotskian idea of teaching as co-construction of knowledge within student-centred activities. Such a view of scaffolding is an unfortunate step back to a traditional, pre-Piagetian way of teaching which is adult-driven in nature and is based in an understanding of teacher – learner interaction as a one-way process. As the metaphor of scaffolding remains increasingly popular among practitioners and educational researchers, there is a need for a clear articulation of the basic theoretical principles which will ensure its appropriate use.

The zone of proximal development as the theoretical basis of scaffolding

The term scaffolding, although never used by Vygotsky, was introduced by Wood, Bruner and Ross (1976) in an attempt to operationalise the concept of teaching in the zone of proximal development (ZPD) (Wells, 1999). The ZPD, defined as the distance between what a student can do with and without help (Vygotsky 1978), is used to explain the social and participatory nature of teaching and learning. Supporting children's active position in their learning and assisting them in becoming self-regulated learners is at the heart of Vygotsky's concept of the ZPD. In spite of the consensus that Vygotskian socio-cultural theory and the notion of the zone of proximal development are at the heart of the concept of scaffolding (Berk 2001; Daniels 2001; Wells 2001; Krause et al, 2003; McDevitt & Ormrod 2002), the interpretations and explanations of the exact ways that scaffolding relates to it have been different. These range from understanding scaffolding as a direct application and operationalisation of Vygotsky's concept of teaching in the zone of proximal development (Wells 1999), to the view that the notion of scaffolding only partially reflects the richness of Vygotsky's zone of proximal development (eg Daniels 2001). In addition, some limitations of the metaphor of scaffolding as an interpretation of the zone of proximal development have been revealed (Stone 1998).

Gordon Wells referred to scaffolding as "a way of operationalising Vygotsky's (1987) concept of working in the zone of proximal development" (1999, pg127). He identified three important features that give educational scaffolding its particular character: 1) the essentially dialogical nature of the discourse in which knowledge is co-constructed; 2) the significance of the kind of activity in which knowing is embedded and 3) the role of artefacts that mediate knowing (Wells 1999, pg127). Mercer and Fisher (1993, in Wells 1999) view the ZPD characteristic of transfer of responsibility for the task to the student as the major goal of scaffolding in teaching. In order to qualify as scaffolding, they propose, a teaching and learning event should: a) enable the learners to carry out the task which they would not have been able to manage on their own; b) be intended to bring the learner to a state of competence which will enable them eventually to complete such a task on their own; and c) be followed by evidence of the learners having achieved some greater level of independent competence as a result of the scaffolding experience (Wells 1999, pg 221). Such view of scaffolding is highly consistent with the definition of the ZPD provided by Vygotsky (1978) and emphasises the collaboration between the teacher and the learner in co-construction of knowledge and skill in the former.

Other authors see the metaphor of scaffolding as limited compared to the notion of the ZPD. According to Lave and Wenger (1991, in Daniels 2002) scaffolding captures teaching performance as a one-way communication process compared to the notion of the ZPD which emphasises teacher-learner

collaboration and negotiation. Thus, scaffolding can be seen as a one-way process wherein the scaffolder constructs the scaffold alone and presents it for the use of the novice (Daniels 2002, pg 59).

Stone (1998) explains that narrowness of the term scaffolding is due to the connation of the metaphor itself. He provides a critical analysis of the metaphor of scaffolding in its application to the field of learning disability. Stone pointed out the twofold role of metaphor in scholarly understanding of a phenomenon. On the one hand, "a good metaphor… is more than a novel label or a graphic description of a phenomenon. If it has been aptly chosen, a metaphor can help us to appreciate as yet unanticipated connections or consequences. In this latter sense, a metaphor is not so much descriptive as it is generative of new ideas" (Stone 1998, pg 344). On the other hand, a metaphor can hinder further understanding of the phenomenon, as the metaphor can be misleading in finding its essential characteristics and connections (Stone 1998).

Stone (1998) analysed a number of limitations of the scaffolding metaphor. He suggested that even though the metaphor captures the key feature of Vygotkian view of teaching as guided by others, it doesn't assist an understanding of the nature of such guidance. In fact, it rather hinders an understanding of Vygotskian interpretation of the relationship between teacher and learner as co-construction of knowledge. Stone referred to a study of Searle (1984, in Stone 1998) who expressed the concern that too literal an adherence to a scaffolding metaphor, especially in the hands of insensitive teachers, could result in "the imposition of a structure on the student" (Stone 1998, pg 349). In other words, the metaphor of scaffolding can lead to viewing the teacher-learner interaction in the classroom as predominantly adult-driven and one-sided in nature. This view of scaffolding, if applied to classroom teaching, might take educators back to a pre-Piagetian, traditional way of teaching through direct instruction. Stone (1998) emphasises the importance of finely tuned communication between the learner and teacher in order to construct new understanding.

Piaget's view of the child as active constructer of their own knowledge is regarded as his greatest contribution to the theory of child development (Berk 2002; Krause et al, 2003; McDevitt & Ormrod 2002). Piaget proposed a new vision of learning where the traditional educational instruction, given to students by adult in a direct way should be replaced by a child-centred curriculum, where the emphasis is placed on the initiative and independent discovery of the child as a self-determined learner. This view of learning is based in child's natural interest and motivation to learn which should be supported in the classroom if we want the children become self-motivated lifelong learners.

Vygotsky took the Piagetian idea of the child as an active learner further, putting emphasis on the role of social interaction in learning and development. Vygotsky viewed children and adults as both being active agents in the process of child's development. In this case the quality of interaction between the

child and the adult which are dialogical in nature and based in the respect of children's interests and needs, become essential (Bodrova & Leong 1996; Fleer 1992, 1995; Tharp & Gallimore 1988). The metaphor of scaffolding, however, doesn't capture the two-way relationship between the teacher and a student, but rather implies a one-sided view of this relationship where a teacher provides a support for the learner.

Summarising the limitations of the scaffolding metaphor, Stone (1998) reveals that a number of educational and developmental psychologists are questioning the theoretical and practical value of the metaphor. However, he concludes, the metaphor should not be "abandoned" (Stone 1998, pg351). Indeed, the scaffolding metaphor could not be abandoned just by a decision of a theorist or a group of theorists: it has been widely accepted and used by an increasing number of educational researchers and practitioners. It is essential, however, to keep in mind that a literal interpretation of the scaffolding metaphor might lead to a narrow view of child-teacher interaction and an image of the child as a passive recipient of a teacher's direct instruction. This falls far behind the Vygotskian idea of the ZPD and the Piagetian view of the child as an active self-explorer. A deeper understanding of the theoretical underpinning of the scaffolding metaphor will promote its creative and informed use by educators. The metaphor of scaffolding "needs to be invigorated with a much more explicit theory. Providing such a theory is crucial for our general appreciation of why scaffolded interactions are effective" (Stone 1998, pg 358).

Teaching in the zone of proximal development and its role in nurturing active learners

The zone of proximal or potential development was initially elaborated for psychological testing in schools (Vygotsky 1962). Vygotsky stated that testing should be based not only on the current level of a child's achievements but also (and mainly) on the child's potential development. The actual level of development (level of independent performance) does not sufficiently describe development. Rather, it indicates what is already developed or achieved, it is a "yesterday of development". The level of assisted performance indicates what a person can achieve in the near future, what is developing (potential level, "tomorrow of development", what a person "can be") (Vygotsky 1978). Thus, the zone of proximal development is the distance between what a person can do with and without help. The term proximal (nearby) indicates that the assistance provided goes just slightly beyond the learner's current competence complementing and building on their existing abilities (Cole & Cole 2001).

The main aspiration of teaching in the ZPD is to see students being actively engaged in their learning with the future prospect of becoming self-directed, life long learners. The definition of the ZPD implies the meaning of teaching as co-construction of knowledge between the teacher and the learner and further transformation of that knowledge into individual knowledge of the learner. The teacher-learner

interaction becomes that of collaboration and co-learning. A particular importance is placed on the active position of the learner, which is essential for becoming a self-regulated learner. According to Vygotsky, the educational process should be based on the student's engagement in an activity where "the teacher is the director of the social environment in the classroom, the governor and guide of the interactions between the educational process and the student" (Vygotsky 1997, pg49). The teacher doesn't influence children directly, but through shaping and fashioning their social environment. The way that adult interacts with the child is essential to supporting children as active, self-regulated learners (Diaz, Neal & Amaya-Williams, 1992). "The teacher's role is to provide the path to independence - a goal of all educators" (Bodrova & Leong 1996, pg3).

Vygotsky did not elaborate the notion of the ZPD in much detail. There "remain a number of questions about how the concept should be understood" (Wells 1999, pg 314). Paris & Cross (1988, in Miller, 1993) pointed to the metaphorical nature of the term and noted some ambiguities in the concept of the zone of proximal development. In the past two decades there was a number of significant publications which further developed theoretical understanding of the ZPD in its connection to instruction (e. g., Chaiklin 2003; Cole 1996; Dixon-Krauss 1996; Hedegaard 1992; Tharp & Gallimore 1988; Tudge 1992; Wells 1999; Wertsch 1985, 1998).

The concept of the ZPD can be fully understood only in the context and as part of the Vygotskian theory as a whole. "In fact, failure to see the connections between the zone and the theory as a whole means that it is difficult to differentiate Vygotsky's concept from any instructional technique that systematically leads children, with the help of an adult, through a number of steps in the process of learning some set of skills" (Tudge 1992, p156). Furthermore, there is a danger that a failure to understand the complexity of Vygotskian theory as a whole can lead to interpretation of the zone of proximal development as a domination over a child's initiative and active position as a learner. An illustration of this point is a recently published criticism of the Vygotskian notion of the zone of proximal development by Lambert & Claydon (2000). The authors, taking Vygotskian definitions of the zone of proximal development out of its context in the main assumptions of the theory as a whole (such as social and cultural mediation of psychological development) state, "We feel…that Vygotsky's ZPD presents a restricted view of learning processes and reduces the learner's role to one of passivity and dependence upon the adult" (Lambert & Claydon 2000, p 29). Vygotsky recognised that the distance between doing something independently and doing it with the help of another, indicated stages of development, which do not necessarily coincide in all people. In this way he regarded an instructors "teaching of a student not just as a source of information to be assimilated but as a lever with which the student's thought, with its structural characteristics, is shifted from level to level" (Yaroshevsky 1989, pg283). Viewing the child as an active participant in their own learning is at the heart of the notion of the zone of proximal development. "Within the ZPD the child is not a mere passive recipient of the adult

teaching, nor is the adult simply a model of expert, successful behaviour. Instead, the adult-child dyad engages in joint problem-solving activity, where both share knowledge and responsibility for the task" (Wells 1999, pg140).

Vygotsky stated that consciousness is constructed through a subject's interactions with the world. Development cannot be separated from its social and cultural context. This led to the idea that we can only understand mental processes if we understand the social interaction and tools and signs that mediate them. Wertsch (1985) believed that it was with this concept of mediation that Vygotsky made his most important and unique contribution to our understandings of children's development.

Vygotsky emphasised that social interactions are crucial for development from the very beginnings of a child's life. He asserted that any higher mental function necessarily goes through an external social stage in its development before becoming an internal, truly mental function. Thus, the function is initially social and the process through which it becomes an internal function is known as internalisation (Vygotsky 1962). The role of social mediation in human activity has been strongly emphasised by Engestrom (1996). The child's activity becomes self-regulated when "external behaviours that were defined in part by the culture and internalised by the child can now function as mental tools for her (Dixon-Krauss 1996, pg 10). To become self-regulated, self-motivated learners children have to develop interest and intrinsic motivation to learn, which according to Hedegaard (2002, pg67) 'emanates from the social part of the child's life. The intentional interaction with adults and their friends can thus be used as a spontaneous factor for creating motivation'. Central to the concept of mediation is intersubjectivity which is described by Wertsch (1985, 1998) as the establishment of shared understandings between the child and the adult. Intersubjectivity is an essential step in the process of internalisation as the adult gradually removes the assistance and transfers responsibility to the child. Diaz et al. (1992) point out the importance of intersubjectivity in promoting self-regulated development in children.

According to Vygotsky, the most important part of children's psychological development is acquisition of the culture to which they belong. Everything that is manufactured and created by people in a culture, that is, all cultural products, is labelled an artefact and it is through these artefacts that the culture influences development. Included are all the things we use, from simple things such as a pen, spoon, or table, to the more complex things such as language, traditions, beliefs, arts, or science (Cole 1997; Vygotsky 1982). Acquisition of mental tools plays a crucial role in the development of children's minds. "The role of the teacher is to "arm children" with these tools…It involves enabling the child to use tools independently and creatively" (Bodrova & Leong 1996, pg3). Children acquire cultural tools in social interactions with more experienced members of the society. Moving from shared possession of tools

(interpersonal) to individual possession (intrapersonal) is associated with gaining independence and a shift in the development of the child.

Thus, to understand the complexity of teaching in the ZPD, it is necessary to take into account such concepts as cultural and social mediation of learning, internalisation, intersubjectivity and the active position of the child. When we talk about teaching in the zone of proximal development, we look at the way that a child's performance is mediated socially, that is, the quality of adult-child interaction. This includes the means by which the educator meets the level of the child's understanding and leads the child to a higher, culturally mediated level of development. This connects to the idea of tool mediation, that is, to a consideration of what cultural tools have been provided for the child to appropriate and use on their own in their independent performance. It also includes a consideration of the conditions that have been created for the tools to be internalised. In other words, the techniques that can be used to ensure the transformation of assisted performance into independent performance should be considered. Stone called it "knowledge consolidation" (1998, pg 358) and pointed out that "knowledge construction is an ongoing process of integration and consolidation" (1998, pg361).

Understanding scaffolding in educational research

The interpretation of scaffolding in current educational practice and research is exceedingly diverse (Jacobs 2001; Hammond 2002). As pointed out by Stone (1998), Vygotsky never used the metaphor of scaffolding in his work (as it would not have made sense to a Russian-speaking person). It is no surprise that the implementation and operationalisation of the scaffolding metaphor in educational research is inconsistent and it "is sometimes used loosely to refer to rather different things" (Hammond 2002, pg2).

In a wide sense, scaffolding has been interpreted as "a form of support for the development and learning of children and young people" (Rasmussen 2001, pg570). The term can be used as an umbrella metaphor to describe the way that "teachers or peers supply students with the tools they need in order to learn" (Jacobs 2001, pg125). The framework of systematic theory, in conjunction with a number of other educational theories (Jacobs 2001; Rasmussen 2001) enriches the context of implementation of the scaffolding metaphor but makes it more generic. Hammond and her colleagues (2002) argue that extended understanding of scaffolding in language and literacy education is needed. They point out the crucial role of language in scaffolding.

A more specific study of scaffolding is presented by Donovan and Smolkin (2002). They take a critical look at the issue of scaffolding in children's writing. They research the role of different levels of scaffolding in children's understanding and demonstration of their knowledge of genre. Tasks range from those that provide minimal or low level support to those that provide middle or high levels of support (contextual and visual support). Interestingly, the highest level in their classification of

scaffolding is described as a "direct instruction with revision" (Donovan & Smolkin 2002, pg435). Their research revealed that while scaffolding can assist children it may also, at times, hinder children in demonstrating their full range of genre knowledge (Donovan & Smolkin 2002, pg428). In particular, scaffolding at its "highest" level, when maximum assistance was provided, proved to be hindering for children's learning. This finding confirms our concern that scaffolding, when understood as direct instruction, might become counterproductive. The ways that the essential characteristics of optimal scaffolding are defined need to be further analysed. For instance, can the highest levels of scaffolding be defined as direct instruction?

There is a variety of definitions of scaffolding presented in the texts for pre-service educators (e.g., Berk 2002; Eggen & Kauchak 1999; McDevitt & Ormrod 2002; Krause et al., 2003). For example, Laura Berk defines scaffolding as "A changing quality of support over a teaching session in which adults adjust the assistance they provide to fit the child's current level of performance. Direct instruction is offered when a task is new; less help is provided as competence increases" (Berk 2000, pg 261). This definition indicates that direct instruction is at the top level of scaffolding. Some other texts focus on the techniques of scaffolding as various forms of adult support: demonstration; dividing a task into simpler steps; providing guidelines; keeping attention focused (McDevitt & Ormrod 2002) as well as providing examples and questioning (Eggen & Kauchak 1999). Breaking content into manageable pieces seems to be a common feature of scaffolding that has been emphasised in the texts (Berk 2002; Eggen & Kauchak 1999; McDevitt & Ormrod 2002; Krause et al., 2003).

The view of scaffolding by educational students: as case study

The quality of teacher intervention in education has been largely associated with scaffolding. The metaphor remains increasingly popular among in-service and pre-service teachers and early childhood educators. Indeed, the metaphor of scaffolding based in socio-cultural theories and widely accepted by educators, can be an effective tool in meeting the Government agendas of nurturing life-long learners. However, there is need for a better, critical understanding of the nature of scaffolding based on a broader awareness of its theoretical underpinnings to ensure its beneficial use.

The project, supported by the University of Wollongong Research Council, Australia, aimed to examine current perceptions of scaffolding by preservice teachers, both in its conceptual and practical implications. A survey was run with educational students in their third year of study in Early Childhood (coded as EC) and Primary (coded as P) education programs at the university. The purpose of the survey was to explore understanding of the main characteristics of scaffolding, its theoretical underpinnings and its value in their professional practice. Participation in the survey was voluntary. Eighty students participated in the study.

The survey was run as part of the students' study of the theories of teaching and learning. It was conducted as an introduction to the study of socio-cultural theory of Vygotsky and scaffolding techniques. It was explained to the students that their participation in the survey was beneficial for them, as it would help their further study of the topic. The background to this is that the students were introduced to the socio-cultural theory of child development in the first year of their undergraduate study at the university; they also looked into scaffolding techniques when studying the teaching of a variety of curriculum areas.

The survey included a number of open-ended questions that invited the students to discuss the following issues: how scaffolding is better defined and what value it has for their future teaching; how scaffolding is different from traditional teaching techniques and what are its key characteristics. The responses were coded in accordance with the key characteristics of scaffolding as identified by socio-cultural theorists and researchers which were summarised above (eg active position of the child, joint activity, tool mediation, indirect instruction). Also a number of other features were identified as they emerged from the students' answers. This chapter focuses on generic understanding of scaffolding by teacher students. The data related to scaffolding numeracy was presented elsewhere (Verenikina & Chinnappan 2006).

Students' responses demonstrated that they valued scaffolding as a helpful technique for their future teaching. All the participants were familiar with the concept of scaffolding and believed it was a teaching technique significantly different to those of a traditional classroom. Their explanations of such differences present a great variety of answers, some being more popular and more in depth than others.

A significant number of both primary and early childhood students demonstrated an understanding of the importance of the active position of the child in scaffolded teaching (21 answers). The following answers were typical:

> *I think scaffolding is giving the student a more active role in their learning as opposed to teacher directed learning (giving students answers without letting them work it out for themselves) (EC13). Traditional classroom instruction can see the teacher providing answers without giving the learner an opportunity to discover/understand for him/her self (P1). A child can learn to do something independently by having an adult assist them when they are still struggling, to help the child make sense of what they are doing so they can use this assisted knowledge next time – thus leading to independence (EC26).*

Mostly important this notion was for early childhood students, as this was in tune with the notion of child centred curriculum in early childhood classroom (27 answers), for example:

> *Traditional classroom instruction is when teacher directed. So the teacher stands up the front and teaches the children. Scaffolding is child directed so the children determine their*

journey of education, the teacher bases their curriculum on the children's interests and knowledge as they build knowledge in the children, firstly with a lot of support and slowly stepping back as the children progress and learn (EC16).

Recognition of the active position of the learner in scaffolding is highly important as it is an essential part of teaching in the zone of proximal development and is a condition of becoming an independent learner in the future. To achieve this, the characteristics of teacher-learner interaction should be considered.

Learning in social interactions with other people was an essential characteristic of scaffolding pointed out by most of the students. A central feature of such interactions (35 answers) was a joint activity in which teacher and the learner engage. The following responses reflect the social dimensions of working in a group:

> *It is more of a team effort between teacher and student. They work together rather than being majority teacher directed (EC13). Traditional classroom instruction is just giving the students work, telling them how to do it and that is it. Scaffolding is building on the work that has been given and doing it together (P2).*

The quality of teacher-learner interactions in scaffolding was explained in a number of different ways. The students' answers ranged from understanding elaborated scaffolding techniques to a generic, and sometimes confused responses. Some of the students (16 answers) pointed out the importance of indirect instruction such as prompting, hinting, guidance and support:

> *It means teachers aren't spoon feeding children. The children are guided, supported and even led at times, though they are putting in the effort too. I value it because it gives children confidence in what they are doing because they think they are doing it (ie reading) on their own, but teachers are there to help and teach when the child stumbles (EC16). Scaffolding is "teaching by allowing the student to discover things themselves, prompting and hinting them in the right direction rather than just telling them" (P16).*

Other participants, however, have difficulties in articulating the quality of interaction in scaffolding and described it in general terms. For example, the following definitions are quite uncertain in what scaffolding actually is and what kind of support it includes:

> *Providing a child with support to help them achieve success in a particular task (P25). ...A teacher/tutor etc. is alongside the child as a task is being tackled; areas of weakness (for want of a better word!) can be identified immediately and applied to the task at hand. There is no delay in advising the student on ways to build upon their knowledge (EC1). I think scaffolding is the way that teachers help children to understanding their tasks properly and direct them and keep children on track of doing the tasks (EC37)*

In some cases (26 answers) the difference between scaffolding and a traditional classroom instruction was not clearly explained. In fact, the descriptions of scaffolding tended look very similar to those of a direct instruction. For example, the following answers were typical:

> *I think it [scaffolding] means that help the students to structure the reading. I think scaffolding is the way that teachers help children to understanding their tasks properly and direct them and keep children on track of doing the tasks (EC2). Teach the students skills/knowledge required to read independently. Eg: alphabet, sounds, phonics, structure. Providing information to develop skill/knowledge (P19).*

Interestingly, modelling and breaking the tasks into smaller pieces were popular instructional techniques which students highlighted as important attributes of scaffolding. Breaking the task down into smaller, easy to manage pieces and steps appeared to be attractive to students (34 responses). For example, they stated:

> *Scaffolding is a technique that uses steps to gradually develop learning. Scaffolding breaks tasks down into manageable steps so it does not become overwhelming (EC8). Scaffolding – breaking tasks down and being more explicit with the teaching of the steps (P11). I think that scaffolding means breaking up the material into parts (as in a scaffolded story when questions are asked to enable the story to continue) (EC3). Scaffolding helps students to progress at a level comfortable for them and learning is progressive, that means that they're learning little bits at a time in order to develop understanding (P26).*

Modelling and demonstration techniques were also often mentioned as important for scaffolding (14 answers):

> *When a teacher refers to scaffolding, it is my understanding that they are referring to the way in which they support their students learning through a combination of demonstrations followed up by teacher-supported activities. Through demonstrations teachers are able to explain how an activity is to be completed through visual stimulus rather than simply issuing a task and expecting the children to know what is required of them (EC15). It means when, for example, a child says 'cat' and the adult replies 'Yes, that's a cat'. The adult scaffolds or models the correct response and this enables the child to repeat it and develop their skills" (EC3).*

It is not a surprise that the above techniques of modelling and breaking the tasks into smaller pieces were attractive to the students as they are easy to grasp and implement. Unfortunately, they do not constitute the essence of scaffolding and can be used as part of any teaching style, for example, a classroom based in the ideas of traditional behaviourism.

Only some students (10 answers) directly connected scaffolding to the notion of the Zone of Proximal Development (ZPD). However, even though the students made an explicit connection to the ZPD, they mostly referred to its definition only, that is the distance between independent and assisted performance. The most frequently mentioned technique was challenging the learner to perform at a higher level of their ability. The following examples illustrate this point:

I would define scaffolding as demonstration and encouraging people to work in their zone of proximal development that is working outside their comfort zone to increase their knowledge and improve tasks. When a teacher says, 'I scaffolded my student's reading', it means that s/he demonstrated and showed the student how to read and then helped the student by prompting, giving positive feedback and making them read stories that are just a little harder, so to improve their reading (EC7).

I would define scaffolding as a teacher helping a student by pushing the student to work at a higher level by providing the student with an answer so that the student can then continue working at their own level (P7).

In the example above, it was obvious, that the use of this characteristic of the ZPD only, did not help in explaining the difference between scaffolding and a direct transfer of the knowledge to the learner.

A technique of changing of the amount of support while the learner is gaining the expertise was mentioned by a number of students (11 answers):

I think it is the amount of assistance you provide the students in completing the task. Depending on their abilities, more or less scaffolding may be required to enable students to gain understanding (EC5). It allows students to develop skills over time, working from what they can do with a lot of assistance to what they can do with a little assistance and finally towards independent mastery of the skill being taught: begin with a lot of support from the teacher; slowly remove support; remove support until there is no support and the students are working independently (P21).

The above technique is an essential characteristic of scaffolding as it refers to the changing level of learner's expertise and moving from shared to independent performance. However, a point of caution is in choosing the exact amount of help required for the students to be actively engaged in the task.

Motivation, engaging activity which can make children interested and therefore actively involved in the task are practically not mentioned, was not mentioned at all, even though it is one of the essential characteristics of active engagement in the task.

Just few students mentioned some more in depth characteristics of scaffolding. For example, one student saw scaffolding as a technique that provides new learners with cultural tools that are essential for becoming an independent learner:

It is more of a support, individual than just a class instruction. It is giving the children the tools they need to decode the text (EC17).

Another student highlighted such a subtle but crucial characteristic of scaffolding as knowledge construction and consolidation:

Traditionally one teacher would instruct a class how to add numbers together, for example, and then give them a worksheet to do it for themselves. The child has to digest the information the first time in order to be able to complete the task. In scaffolding the child is working in the ZPD and can work above their own understanding in order to gain understanding (EC26).

The lack of awareness of some in depth characteristics of scaffolding indicated that the students might have some difficulties in understanding them and more explicit connections of scaffolding to the theory needed to be made.

Discussion and conclusion

The results of this study indicate that, on the whole, pre-service teachers were aware of the practice of scaffolding and appreciated its potential use in their day-to-day teaching. The participants saw the scaffolding metaphor as a useful concept that allows pre-service teachers to move away from the direct instruction of a traditional classroom and search for a richer and more sophisticated educational tool. While experiencing the need to find an alternative to the traditional forms of educational instruction, student teachers look for a variety of new teaching techniques that are provided by modern pedagogy. They demonstrated understanding of the differences in the quality of teacher-child interaction when scaffolding approach is used as opposed to direct instruction. A variety of indirect techniques such as questioning, hinting and prompting were mentioned. However, a few participants expressed confusion about the quality of teacher-child interaction. In addition, a high proportion of students' responses suggested a lack of understanding of the relationship between learning environment provided by the teacher and its impact on children's use of prior knowledge.

The majority of student teachers displayed understanding of some basic techniques of scaffolding such as breaking the tasks into smaller pieces, modelling and demonstration, which are relatively easy to grasp and implement. The more complex levels of scaffolding did not receive much attention in students' responses. Just a small number of answers indicated pre-service teachers' awareness of some in depth scaffolding characteristics such as quality of teacher-student interaction and acquisition of cultural tools. The lack of students' awareness of such characteristics of scaffolding suggested that they might have difficulties in their understanding. This results seem to suggest that pre-service teachers lack a clear understanding of the conceptual basis of scaffolding practices and there is a need to implement teaching strategies which could assist such an understanding. The understanding of the theoretical principles of scaffolding will allow pre-service teachers to anchor their repertoire of scaffolding techniques provided by recent research. Over the past two decades, an increasing number of educators have used the concept of scaffolding to describe and explain the role that teachers can play in guiding children's learning and development.

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This chapter presented an analysis of the metaphor of scaffolding in its connection to the theory of Vygotsky, and the zone of proximal development in particular, as its theoretical basis. In spite of the obvious limitations of the metaphor compared to the concept of the ZPD, the notion of scaffolding remains increasingly popular among educators - researchers and practitioners. The term appears in the most modern educational psychology textbooks for pre-service teachers which cover the theory of Vygotsky.

The case study of a group of educational students demonstrated that the scaffolding metaphor is a useful concept that allows pre-service teachers to move away from the direct instruction of a traditional classroom and search for a richer and more sophisticated educational tool. While experiencing the need to find an alternative to the traditional forms of educational instruction, student teachers look for a variety of new teaching techniques that are relatively easy to understand and implement.

The scaffolding metaphor provides educators with an easy to grasp justification of the quality of teacher intervention in children's learning. However, due to its metaphorical nature of the term, scaffolding has a potential to be interpreted as any kind of help in general or even as a variation of direct instruction. If scaffolding is understood as direct instruction, it can become a hindrance for children's development as active, self-directed learners. The idea of transformation of shared activity into its individual form is important for becoming a life-long learner. In particular, understanding scaffolding as providing the young learners with cultural tools, the appropriation of which enables them to become independent learners. A deeper understanding of the theoretical underpinning of the scaffolding metaphor will promote its creative and informed use by educators. In addition, the attributes that characterise scaffolding as different to other kinds of instruction need to be articulated.

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