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Task-based Learning

An opportunity for focused learning in Technology Education

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Introduction

This chapter begins by outlining what is meant by Task-based Learning (TBL). The focus will be centred on the need to first define the content of the task. This is particularly important in Technology Education, because of the ideas of *intentionality* and *establishing a shared goal* in the TBL literature (Stelma, 2014). This is a challenge for the technology educator due to the ways in which content is conceived within the subject. The philosophy of technology invariably describes technological knowledge as *action oriented*, and resultantly, opposed to having a bespoke body of declarative knowledge that traditionally defined school subjects. Technology Education is necessarily more eclectic in its selection of what content is considered relevant. Ultimately this leaves the technology educator with more decisions surrounding the nature tasks to be used, the technological context of tasks, and how the task is framed to learners. Thus, although the focus of this chapter is pedagogical, it is first necessary to question the *purpose* behind tasks in Technology Education. This exploration of the organisation of teaching and learning within Technology Education leads to the question; *why are you adopting Task-based Learning*?

There are several examples relevant to Technology Education that we can use to explore this. Take for example the material oriented vocational predecessors to Technology Education, such as the 'jointing' component of woodwork subjects. The organisation of teaching and learning was to 'practise' a specific skill several times before this may be applied to a larger 'project'. The organisation of teaching and learning in this context is relatively straightforward. There is clear and commonly understood order through which progression can be measured. A lap joint comes before a half lap joint, which in turn comes before a dovetail half lap (Figure 21.1).

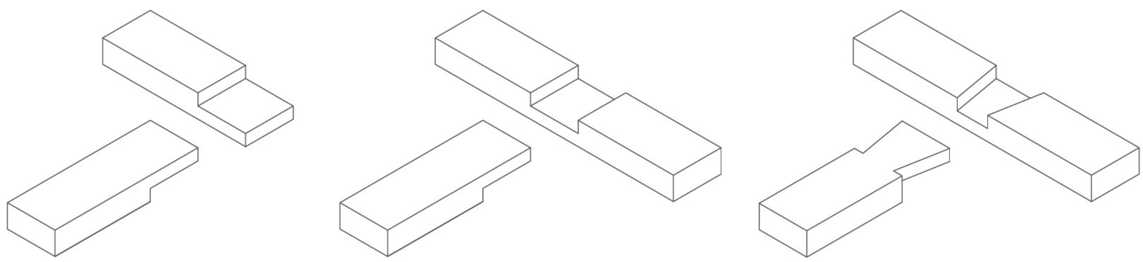

Figure 21.1 Progression of jointing techniques in woodwork

Importantly, from an organisation of teaching and learning perspective, the understandings of progression facilitated by the relationship between different craft processes, leave the teacher with an overview of their scheme of work. As noted, this is commonly understood between educators and learners, and resultantly, tasks may be devised to facilitate learning associated with a specific content area. The same principle applies whether the focus is on the technologies of *electronics*, *food*, *mechanisms*, *metals*, *textiles*, etc.

Modern Technology Education, in its various manifestations, ranging from those focusing on applying technology principles through design and make to those which focus on learning about technologies and those where critiquing the impact of technology predominates, requires significant input on the part of the technology educator (see Section 1: Conceptualising Technology Education).

This chapter will draw on the body of research into TBL and consider it application to Technology Education. There is limited literature in the discipline of TBL, but the approach has parallels to how the vocational predecessors to Technology Education were taught. An example of this type of pedagogy has been called Focussed Practical Tasks in previous versions of the National Curriculum in England. In this chapter I will draw on the ideas from Second Language Acquisition (SLA) to inform a discussion on the use of TBL in Technology Education. The purpose here is not to provide a framework for teaching technology, but to provoke though on the readers conceptions of the purpose of teaching, and the organisation of teaching and learning. These are both central components of TBL. Example of the origins and rationale for TBL, as used in SLA, are used to describe the underlying principles. Additionally, some findings from the SLA literature are put forward and a pedagogical framework for progression in Technology Education is considered. In conclusion the chapter outlines some of the potential advantages of adopting TBL framework in Technology Education.

Learning in Technology Education

It is important to begin a discussion about TBL in Technology Education by considering the nature of what is to be learned, because of the procedural approach inherent to approach. Stemming from research into learning languages, specifically Second Language Acquisition (SLA), TBL does not constitute a strict description of teaching and learning, but rather an interpretation of teaching and learning that has been observed to be of particular value. TBL thus, does not encompass an explicit pedagogical approach, but the framework that links tasks within the "procedural syllabus" (Prabhu, 1987). With SLA research, this has resulted in the development and articulation of the cognitive processes of *implicit*, *incidental*, and *explicit* learning. In the context of SLA, although expansive, the content to be learned has been articulated and is commonly understood.

If we return to the example of the woodwork or wood technology curricula, this is also well articulated and commonly understood. Sometimes this differentiation between technical and technological (Technology) education is made to emphasise how the intention of our subject has evolved. Once the pedagogical model was compared to that of the medieval guild, whereby the learner practiced and over time perfected the techniques associated with, for example, crafting a box dovetail joint. This was based on previously learning how to use a mallet and chisel in less demanding tasks, such as a cross halving joint. With the changing emphasis from technical to Technology Education, the technical context (i.e., woodwork) has not necessarily changed. However, what is to be learned has. With this, some important questions have emerged for consideration:

- Is the end goal for engaging with wood, as a material, to develop a knowledge and understanding of wood as a material? And if not, what is the purpose for this context?
- Perhaps more importantly, if this context for technology changes, for example many Technology Education curricula internationally now contain a graphic communication element, what is the resultant effect on learning?

This is not unique to any one context for Technology Education as the origins of the subjects varies significantly between international contexts (Banks & Williams, 2013). Stemming on occasion from vocational, industrial arts, or craft-oriented origins, Technology Education currently resides in a place of flux in curricula.

In some contexts, this has resulted in a systems-oriented perspective on what technology is being included on curricula, and further, some national curricula have taken to including the *nature of technology* as a core component on curricula (Jones et al., 2013). The nature of tasks set by the technology educator can indicate how they perceive the subject – i.e., are the tasks procedural in nature, focused on practical skills (e.g., correct use of tools and materials), or conceptual, focused on so-called soft skills (e.g., developing creativity, collaboration, etc.)?

What does this mean for the technology educator?

Ultimately, the shifting emphasis from vocational education, and the inclusion of broader perspectives on the nature of technology, has resulted in the technology educator having greater autonomy in designing learning contexts. Although the traditional contexts of vocational (predominately material oriented) education remain, the focus of learning has shifted to engaging with technology in its wider sense. Spendlove (2012) notes that this shift in emphasis to a broader perspective on technology is a unique strength of the subject area. Technology is recognised as being at a significant advantage, as ownership lies with the educator who can draw upon their own and their learners' interests, and recent technological developments to engage learners with relevant concepts when required. Spendlove further notes that the difficulty inherent to a curriculum is that the progression of learning in technology is not mapped out. Technology Education, apart from vocational education, does not have a permanent and fixed body of knowledge. Although the loosely defined curriculum boundaries (McGarr & Lynch, 2017) afford the technology educator the opportunity to be proactive and take ownership of their curriculum, the shared focus between (1) technological content (associated with the context *for* technology), (2) technological processes (independent of context and often represented as design oriented Technology Education), and, (3) the nature of technology, the sheer variety of technology oriented tasks encompassed required significant forethought on where learning in technology is going.

Task-based Learning

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As noted in the introduction, the term TBL has is origins in second language acquisition. Although adopted for a number of different reasons, the underlying emphasis was endorsing a communicative approach to language teaching (Skehan, 2003). The rationale put forward was that it was not sufficient to focus only on language structure, and that this needed to be accompanied by a concern to develop the capacity to express meaning (Widdowson, 1978). More recently, TBL has found its way into other areas of learning, notably medical education (Harden et al., 2000; Ozan et al., 2005), and computer-aid learning (Lee & Shin, 2012; Whittington & Campbell, 1998). The emphasis in these environments has shifted from SLA, but the emphasis on language acquisition remains. In these instances, the "learning is built round the tasks and learning results as the learner tries to understand not only the tasks themselves but also the concepts and mechanisms underlying the tasks" (Harden et al., 2000).

As a result of this, it is not uncommon to read about TBL being used in conjunction with pedagogical approaches from Direct Instruction (Becker & Carnine, 1980) through to Discovery Learning (Bakker, 2018). Based on the conception of what is to be learned, the nature and structure of task will differ, and the nature and structure of the pedagogical approach may also differ. A challenge for Technology Education here is the relatively small amount of empirical research in Technology Education. There are plenty of examples from Science, Maths and English/Creative writing that can be used to explore TBL in context. Further, there are multiple different models of TBL used today (e.g., Nunan, 1989; Skehan, 1998; Willis, 1996). However, the commonality between different models has been reviewed to arrive at a common framework. There are three common stages to the different models of Task-Based Learning: (1) Pre-task, (2) Task, and (3) Review (discussed below). Within this however, layers of commonality have also arisen (Figure 21.2).

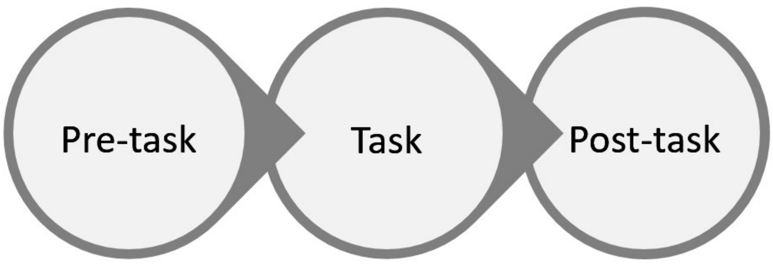

Figure 21.2 Stages of Task-Based Learning

In the pre-task phase, the teacher articulates what will be expected from the learner in the task phase. Depending on the task, and learners' familiarity with the task context, different levels of 'priming' may be necessitated at this stage. In more advanced TBL scenarios, learners are often responsible for framing the direction of the task. For example, Swain (1998) proposes that the task scenario be designed to encourage learners to 'notice the gap'. In these instances, an exploratory approach to task design is endorsed, where little explicit instruction is provided to learners. Depending on the type of activity designed, learners then perform the task. There are significant differences in the support offered by teachers at this stage, again largely based on learner familiarity with the context and the

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nature of priming. In any case, the teacher is not the driver of the activity (with descriptions ranging from observer, counsellor to critical friend), and the pedagogy is thus often described as student-centred. The post-task phase is again largely dependent on the nature of learner output framed in the pre-task phase. For example, within SLA the focus often resides with learners creating a tangible outcome, such as a piece of text, audio recording etc. Here learners review one another's work and offer constructive feedback. Where the task is more far reaching, iterations of reflective review can be built in.

Core concepts

Despite TBL transcending pedagogical approaches, there are several key concepts, common to individual tasks. These concepts are developed from a variety of TBL contexts.

Pre-task

Defining the task purpose is commonly referenced as the first stage in any TBL activity. Establishing the outcome (or types of outcomes) is important at this point. This is not to govern exactly what is to be completed by students during the task, but to guide expectations. In some contexts, the term *intentionality* or *shared intentionality* is used to describe this process. The intent here is that the outcome of learning is not necessarily known by the teacher beforehand. The variability of tasks within Technology Education has some direct parallels to TBL here, for example in Kimbell's (1994) discussion of the progression of tasks within Technology, a framework of constraints model is put forward. Take for example, the jointing example discussed above. This represents a scenario where the intentionality of the task is known, and most likely discussed in detail with the learner upon introduction. Learner autonomy within this task is limited, as the focus is procedural in the development of psychomotor skills to craft a single joint. However, once we consider this task in the broader scheme of work, we realise that the jointing task serves as steppingstone to developing the capability to operate in a technological way. At a later stage, the learner will be prompted with a design brief, and there will be no discussion of the craft element of cutting a dovetail or cross-halving joint. The shared intentionality here will lie in discussion about what joint would be more appropriate for the learner's design. The progression of tasks within Technology Education will be further discussed later in the chapter.

Another core concept within the pre-task phase is the discussion with learners surrounding prior knowledge. Not to be confused with *priming* – whereby specific information about the task context may be related to learners – the discussion surrounding *prior learning* is centred on the principles or practices of the domain. In SLA, an example would be to use a common form or type of task, and to focus students on language (use or meaning). In this instance, technical information regarding how to complete the task is known, with the focus remaining on student communication. Willis and Willis (2007) provided a taxonomy of task types that can be used. With the interplay between focusing on meaning and focusing on form, they state that a focus on form occurs when the teacher isolates a specific structure and explain it outside of the context of the communicative activity.

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Within Technology Education, an example here could be the design brief. It is likely that students in the subject encounter design briefs on a somewhat regular basis. And within a TBL approach focusing on the context and not the form (design brief) of task would afford students the possibility to research the specific context of the design brief, such as client requirements. Finally, within the pre-task phase, the literature outlines the importance of setting clear time boundaries for task completion.

Task (and forms of tasks)

In beginning the task, learners should have a clear understating on the focus of the task and the interplay between the task format and technical context. If the focus is on the task format, then the technical context should not be new, and likewise if the focus is on a new technical context, the task format should be familiar to the learners. Again, attention should be drawn to pedagogy here. As noted, a specific pedagogical approach is not endorsed within the TBL literature, however, it should be noted that there is an emphasis placed on meaning making in the literature, students often complete tasks in pairs or small groups.

At this stage it is also important to discuss the different forms of tasks that are used:

1. knowledge constructing tasks, or
2. knowledge activating tasks.

Willis and Willis (2007) used the terms *listing* and *sorting* to clarify the distinction between knowledge *constructing* and knowledge *activating* tasks. The advantage of adopting listing tasks is that they can serve as a useful introduction to a topic and provide an opportunity for the teacher to set the scene and introduce relevant vocabulary. These knowledge constructing tasks can be viewed as facilitating tasks as they help “lighten the processing load when learners are tackling more complex tasks, as by then, many of the topic words and phrases used for listing will already be familiar” (p.72).

Knowledge activating tasks is a broad category that includes a variety of cognitive processes, including *sequencing*, *ranking*, and *classifying*. The purpose of these tasks if to promote salience with the new technical content introduced within the previous tasks, so that students are comfortable communicating in this context.

Finally, within this phase, the evolution of tasks and relationships between tasks should be considered. Here the literature is quite clear in the framework for progression. As learner familiarity (and in turn competence) develops, there is a gradual emphasis placed on the importance of *planning*, *reporting*, and *presenting*.

Post-task

Upon completion of the task, and students have something to present, the *post-task* or *review* stage begins. Models of TBL highlight the importance to teacher involvement during the Task phase in preparation for the review. For example: Was there any part of the task that most students found difficult? Should this be addressed first? Etc.

Following a general overview of task performance, a feedback session is used to discuss the success of the task and consider suggestions for future improvements. Likewise, learners may wish to discuss any challenges within the task. Such as the use of new terminology or vocabulary, or a new form of task. In addition to teacher assessment, an increased emphasis has been placed on the role of learner self-assessment. Ellis (2003) noted that self-assessment fosters students' autonomy, and "can serve as a means of developing a reflective attitude in the learner and can stimulate goal setting" (p. 302).

Progression in Task-Based Learning: Planning for teaching technology

As discussed above, it should be apparent that TBL does not endorse specific pedagogical methods, but is rather a framework that guides a teaching and learning. In Technology Education, negotiation and justification of content and degree of learner autonomy is afforded to the technology educator (see Section 1: Conceptualising Technology Education). As noted in the introduction, the Technology Education syllabus, specification, or curriculum will have significant influence on content. Irrespective of the manifestation of technology under consideration (i.e., conceptual, technical or systems), the technology educator has the ultimate responsibility for organising appropriate teaching and learning. A notable example in the literature of how progression in Technology Education is conceptualised is Kimbell's (1994) framework of constraints model.

The multiple potential purposes for engaging with any Technology Education task, leave significant room for variation in the nature of learning that occurs. Although this may be viewed as a significant advantage of the subject area, the variance facilitated by loosely defined curricular boundaries means that the role of the individual technology educator is amplified. Their conception about which aspects of Technology Education are more important or relevant in a specific task will come to the fore in their teaching, and in turn, become to focus of student learning. Conceptions of the purpose of teaching, sometimes referred to as a "personal construct" (Banks et al., 2004, p. 144) of a subject, reflects a teachers view of what constitute good teaching and a personal belief of the purpose of a subject. My doctoral research (Doyle, 2020) focused on this relationship between an educator's tasks used in Technology Education, and the conception of the purpose of teaching.

Through interviews with technology educators in multiple international contexts, I analysed the organisation of teaching and learning and their relationship to the broader goals for teaching technology. Ultimately, this analysis resulted in the presentation of three different conceptions for the purpose of teaching technology (Figure 21.3). Importantly, teachers were found to hold multiple conceptions, and changes between conceptions both within tasks and across tasks were observed, as detailed by the grey dashed arrows.

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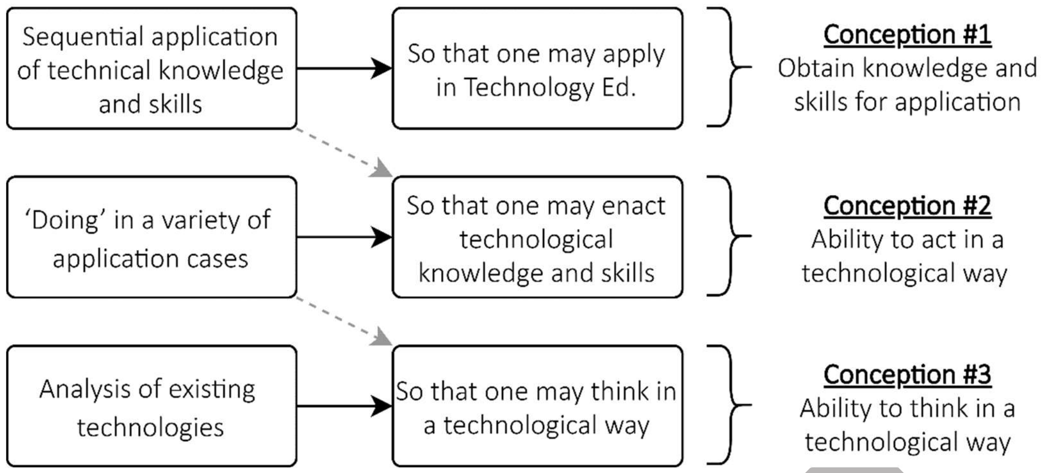

Figure 21.3 The purposes of teaching technology (Doyle, 2020)

The left-hand side of the model outlines the organisations of teaching and learning identified during the study. It is important to note the treatment of 'application case' here. Not to be confused with national context, application case as used to describe differences in technical contexts. For example, where a teacher may navigate between wood technology and electronics. Teachers' treatment of application case, along with their goals for activities delineated the three conceptions.

Conception #1: sequential application of technical knowledge and skills

Here the focus lies with the development of explicit knowledge and skills associated with a singular application case for technology. This approach was associated with an instrumentalist view of technology, where students are to be familiar with 'using the technology available' and 'learning all about the technology you use'. The organisation is sequential in that the relationships between learning activities from year-to-year is governed by the development and refining of explicit knowledge and skills. This approach was also reflected at a micro level of specific activities, whereby students 'practiced' a skill a number of times before 'applying in a final project'.

A TBL approach within this organisation of teaching and learning mirrors the jointing example discussed earlier. The scheme of work is founded on the declarative knowledge associated with knowing what technology is, and the procedural knowledge associated with using various technologies. This can be centred on woodworking tools inherited from vocational education, but the approach may be replicated with emerging technologies, such as rapid manufacturing techniques or virtual technologies. The framing of these tasks, irrespective of the application case, is largely controlled by the technology educator. The outcomes are predetermined, as the focus of learning remains on the development of known variables. For example, learners will understand how the paper processing industry has evolved, learners will programme a traffic light system, learners will accurately cut a dovetail joint, etc.

This is not a criticism of these activities; they are foundational to the progression of learners within any Technology Education. The moot point is whether the activity can be characterised as technological in nature (Kimbell, 2017). Furthermore, from a pedagogical perspective, the nature of tasks endorsed within this approach are more closed. In one sense this means that sharing the intentionality of tasks becomes easier as the content is naturally prescribed. However, it also calls into questions whether a TBL approach is necessitated. In recent times there has been an advocacy for the use of direct instruction as a pedagogical approach. Where there is explicit declarative or procedural knowledge relevant for learner progression, perhaps TBL is not the most appropriate pedagogical approach.

Conception #2: 'doing' in a variety of application cases

Whereas teaching and learning was specialised to a specific application case previously, here the objective was to engage students with 'doing' technology in multiple different application cases. The rationale behind the selection of application cases varied from teachers' personal interests, to student driven and to 'topical technologies' – such as prominent news stories, for example, driverless cars or other topics from popular culture. Progression within this approach to organising teaching and learning is more difficult to articulate. This appears to be partly influenced by the unforeseen difficulties associated with engaging with technological activity in a novel application case. For example, where a teacher had presented three tasks with vastly different application cases, they were asked to describe the commonality between the three tasks. In essence, what made there three tasks technological?

The approach to organising teaching and learning within this conception emphasised the importance of developing an ability to familiarise oneself with a novel application case, and the ability to transverse multiple application cases. To take the electronics and wood technology examples from earlier, teachers' emphasised the importance of problem navigation and problem solving independent of the specific context. This often resulted in learners navigating novel contextual problems with no knowledge of the application case. In emphasising one's ability to adapt to and navigate novel application cases, the role of a singular context for technology was not emphasised, but rather the skills to make decisions and take actions within a new application case. In applying the principles from TBL, the intentionality of the task(s) here was in developing one's ability to navigate multiple complex or novel situations. With this, a significant goal for learning activities lay in one's ability to develop the heuristics to navigate new application cases. The stark contrast between the previous scaffolding approach towards skills development and the somewhat eclectic approach to which application case specific knowledge and skills are developed is illustrated by one of the teachers in the study:

> …if they can take away some practical skills, the fact that they enjoyed it and it opened their eyes in the nine weeks that we've had them that they can do something that they didn't think they could do.

Furthermore, in using Willis and Willis (2007) differentiation between knowledge constructing and knowledge activating tasks, the role that knowledge associated with the specific application case plays becomes clearer. The *content knowledge* and *practical skills* appear secondary to students' ability to act in a technological way. Familiarising one with the novel application case was held as the most important criteria for success in such tasks. This reflects Willis and Willis' (2007) focus on form approach. The technical content associated with the specific application case, although important for success in the task, came second to and understanding of how to engage in technological tasks. Importantly, student failure was embraced by interviewees across all conceptions but here, failure was identified as inevitable, even encouraged. The mandate for this appears to lie in encouraging students to take risks, with a broader understanding of the 'technological processes' through engagement being held up as the panacea for engagement with Technology Education.

Conception #3: analysis of existing technologies

The third approach to organising teaching and learning did not prioritise engagement with a physical 'doing' in Technology Education, instead the focus is placed on a form of 'reflective critique'. Activities were structured in such a way that students identify and apply a series of 'analytical lenses' to various technologies. Technologies in this instance are taken, in a broad sense, to constitute *artefacts*, *systems*, *solutions to problems*, and *innovations* without problems. The 'analytical lenses' metaphor was used by a number of interviewees, literally representing the need to adopt different 'perspectives' or 'points of view' on the various technologies under consideration. With examples such as *historical*, *ethical*, *social* and *environmental* perspectives evident within the various application cases. The variance of technologies studied mandated that learners switch between lenses and discuss which is appropriate or useful in a particular context. Here, how technological solutions and innovations have been developed, and how technological systems operated were all identified as appropriate application cases for study. For example, the 'paper processing industry', 'school ventilation system' or the 'traffic light system outside the school' were used by a single interviewee. When questioned on the commonality of student experience from year-to-year or indeed between teachers in the same school, interviewees cited the importance for learners to develop an understanding 'that technology is something much more than building' as the goal of teaching. The continuity of application cases from year-to-year appeared to be largely driven by teachers' interests, and outside of this, somewhat sporadic.

Here perhaps the most significant parallels may be drawn with TBL. With the apparent eclectic selection of application cases, and a largely theoretical approach to tasks, more of an emphasis is placed on knowledge construction. The purpose of these tasks was to promote salience with technical content associated with the application case. More importantly, this results in a series of tasks designed to ensure learners are not only competent at operating in a technical application case but communicating across contexts.

With this focus the continuity between tasks is not the specialisation of expertise in a domain or application case, the continuity lies in technological ways of thinking. This is held as the ultimate goal for the subject area. Representations of content as declarative knowledge are 'dictated by the context or projects that you are working in'. For example, in response to a question on the specific 'content' of technology education, this interviewee suggested that although the subject matter of technology education is difficult to define:

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> … there are certain techniques and skills that people who are technologists need to have … the sorts of skills and knowledge that the students need to have as well. And so, there is an underlying content, if you like, because you can't arrive at those outcomes [thinking] without that...

An important point of note is that the conflation of technology education with science education was identified by interviewees specifically within this conception. The scientific nature of application cases for study appeared to influence this. This resulted in students 'mix[ing] up the technology subject with the natural science subjects such as physics and so on', mirrored by a sentiment that 'lots of other areas [departments] in the school don't really understand what happens' in the technology subjects. Although difficulty in explicating the SMK of technology appeared to be challenging for interviewees, it was also viewed as a strength of the subject area:

> What the context is, and exactly where you might be drawing that knowledge from is not prescribed. That's an advantage. Too many people see it as a disadvantage because it's not prescribed. But it gives me as a teaching professional in the classroom the freedom to draw from whatever knowledge base I need to, to support the learning of the students.

These excerpts highlight the foundational principle associated with this conception. Irrespective of the application case in which the interviewee was teaching, there is a commonality in what it is that they want students to learn. Thus, whether the organisation of learning forefronts engagement with, observing, or indeed reflecting on historical technological innovations or advancements, the purpose behind engagement with technology is in developing a broad understanding of 'what technology is and how it affects their [students] lives' and the ability to 'think in a technological way'.

Summary

> "Through engaging in a reflective and reflexive approach, all teachers of technology should have a clear, justifiable personal construct of what they believe constitutes 'effective' teaching. This view has to be rationalized and contextualized in relation to the environment in which they will be delivering Technology Education." (Spendlove, 2012, p. 41)

It is important preface a discussion about framing tasks within TBL with a consideration of the purposes for teaching technology, because of the various overlapping goals in the subject. Other parts of this book have outlined the philosophical basis of Technology Education, and how goals for teaching the subject have developed. Here, all we need to consider is that there are multifaceted goals, and that the technology educator must plan for teaching in this space. I don't like using the term 'content' when thinking about Technology Education. There is something inherently uncomfortable about describing our subject(s) by attempting to articulate 'what should be learned'. The TBL approach provides an alternative to this problem, in sharing the intentionality of tasks with learners, a discussion of the different possible approaches to technological activity is brought forward. This discussion can manifest in multiple different ways, as the three approaches towards organising teaching and learning outlined in the previous section evidence.

Within the first conception, the use of scaffolding and subsequently the coordinated dismantling of scaffolding (fading) as learner progress evidences a specific context of skills acquisition. The next approaches are more interesting for this discussion and they problematize a central tenet of Technology Education, the association between *context* for learning and the *content* of learning. In my doctoral research, questions arose surrounding the relationship between content and context, whether it is possible to teaching the general principles of Technology Education independent of a specific context, and if this is possible, how transferable these skills between different contexts are. This is important when discussing TBL because of the differentiation between language and form discussed earlier. If for a moment we take the content of traditional tasks as the language of technology. This means that the ability to cut a cross-halving joint, or indeed to read a resistor, in fundamental to developing technological capability. However, we can also consider the form activities in technology as the subject matter. With this, the focus remains on the types of activities, the ways of working, irrespective of the application case or technical context. In framing the traditional design brief as the content of Technology Education, an activity oriented approach is endorsed. The skills of researching, modelling and critiquing the development of design solutions become the content of Technology Education.

This shift in emphasis may also be viewed through the different stages of TBL. The pre-task stage will focus on task orientation, explaining to learners that although the application case may have changed, the nature of activity remains the same. The task itself allows learners to apply all of the knowledge, skills and values associated with technological capability. Where relevant, learners may identify the need for additional research, a new iteration of the model or an analysis of material sources, etc. Again the point is that the different tools available to learners are the focus here. As the decisions around how to progress through the activity are centred, this allows the post-task stage to review these decisions. Ultimately, encouraging learners to reflect on the process and not the product of the learning.

The philosophy behind TBL is to encourage more authentic learning opportunities for students through removing some of the boundaries associated with 'getting it correct'. The parallels between TBL as described throughout this chapter and the philosophy of technology are immediately apparent. The TBL approach affords the technology educator a framework for moving to focus of learning away from the teacher and place it with the technology learner. Through the authenticity of real-world context, it facilitates an approach that moves beyond teaching abstract knowledge and situates it in a real-world application. Perhaps most importantly, it provides the technology learner with a way of understanding language and processes as a tool, instead of as a specific goal.

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