

**What is the role of a design and technology teacher within a practical lesson? In my lessons what are pupils progressing in? What am I doing to help them?**

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**Abstract**

This study looks to discover what role a teacher plays in D&T practical lessons. This question originates from a noted ambiguity on this following an observed lesson. When questioned, I was unable to articulate what my role was, or should be in promoting the progress of my pupils. After evaluating all accessible relevant lesson plans completed over the past seven months, skill development is highlighted as being the most dominant aspect of my focus. After a discussion of how this narrow focus impacts my role and the experience of my pupils, implications are presented.

**Introduction**

The research question of this study relates to learning what the role of a design and technology teacher is within a practical lesson. Two sub questions from this topic are: what are pupils progressing in my lessons and what am I doing to help them?

Capel, Leask and Turner (2013) identify the job of any teacher as being to 'make pupils learn'. As vague and simplistic as this statement may be, the current 'buzzword' or 'hot topic' within current educational discussion is arguably equally as ill defined. 'Pupil progress' would appear to be key on the inspectorates agenda, which poses the question of how is progress in design and technology practical lessons measured and what should D&T teacher do to maximise progress?

To unpick this question, a context is provided with my initial perceptions about my role in practical lessons is presented, before reviewing literature on some relevant issue within educational texts. Following this my research method is described before the findings are reported and then discussed. Finally, the implications for my future practice are considered. It is hoped that through this process I will be in a more informed position to help maximise my pupil's progress.

**Context**

The decision to select this area of focus relates back to me being questioned about my role within a practical D&T lesson during my second placement. During the post observation feedback, I was unable to explain when questioned what I was doing to help the progress of the pupils during the lesson. Furthermore, at that moment I was unable to articulate what the role of the teacher should be during practical lessons beyond observing and troubleshooting, neither of which I could confidently say was helping towards the learning of my pupils. Later, I was able to reflect that I need to take more responsibility for planning my own involvement/activity when pupils are actively engaged in practical work as well as the activity of my pupils.

In a previous lesson in the week prior to the discussed observation, I had similar cause to question my role within a practical lesson. This time in a food lesson, I observed how all my pupils were all competently working without the need of my assistance/support. Given this realisation, I found myself wandering round the room observing the pupils work from a distance whilst trying to

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decipher whether my inactivity was a positive thing or not. Was the fact that they did not need my help a positive thing because they had absorbed the information needed to independently complete the task? Or, should I be doing something more, if so, what? Was I wrongly taking on the role of a technician/supervisor below my level of responsibility, or had I created a pupil centred lesson environment where my pupils are learning by experience? If the latter were to be accurate, this would have been simply due to luck rather than any judgement made of my part in the planning of the lesson.

My evident ambiguity of good practice/pedagogy in the teaching of practical lessons was something I felt I needed to explore further to help me improve my teaching, and more importantly improve the learning progress made by my pupils. I felt that I needed to gain a greater understanding about the type of learning that should be going on during a given practical task, thus equipping me with some direction on how I can promote this learning in my lessons. As a result, my judgement criteria within practical lessons would hopefully become broader than simply assessing the quality of a final product or demonstration of skills.

### Literature Review

*'Good quality teaching depends on effectively planned lessons'* (Ofsted 2011 in Basset, Bowler and Newton 2013 p.99).

Planning lessons is described as a *'difficult and time consuming'* task (Wood 2010 p.114). However, as suggested from the citation above, perhaps one of the most essential tools a good teacher must possess is the ability to plan effectively. Elliot (2007) describes planning as being the underpinning activity for success. He also makes the point that *'great lessons are a product of great planning'* (p. 60) and how aspiring to teach great lessons is only achievable through putting *'time and intelligent effort'* into the planning process (ibid). Wood expands upon this notion by suggesting that *'poor teaching, classroom management and behaviour stem from a lack of explicit planning'* (2010). What is clear from the cited literature is how effective planning can mean the difference between a successful and unsuccessful lesson but what is it that signifies when a lesson has been successful and how can this be promoted?

To refer back to the opening paragraph of this literary review, the phrase 'pupil progress' was identified as being particularly relevant within the current education climate. This can be attributed to the inspecting body Ofsted's apparent intensified scrutiny of how well pupils are seen to be progressing (Bromley 2013) and its inclusion within the Ofsted school inspection handbook grade descriptors (Ofsted 2015). So if pupil progression is the measure of a successful lesson, how can this be promoted through lesson planning?

Titchmarsh (2013) likens planning for progression to differentiation, possibly because much of the same consideration applies when planning for both. Levinson's hierarchical framework is cited by Titchmarsh (ibid) and proposes how planning for progression as involves four aspects as summarised below:

1. Knowing what it is you want the pupils to learn;
2. Knowing what pupils already know;
3. Knowing what activities will help pupils move between the two;
4. Knowing how to recognise when pupils have successfully made this move.

This implies a hierarchy of importance, with the key aspect being that effective lesson planning is having a clear idea of what the pupils need to know, understand or be able to do at the end of each lesson. This might explain why Levinson makes this his first point in planning for progression. Elliot

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(2007) goes further by describing this as being a more important aspect of planning than what the teacher actually plans to *teach* the pupils. Bassett, Bowler, Newton (2013) and Elliott (2007) all seem to disagree with Levinson's view of the most important factor when planning lessons, they consider understanding the pupils' prior attainment as being the most important factor within the planning process. Interestingly for me, it is said by Wood that trainee teachers at the beginning of their teaching careers will often see the lesson as an 'event' and planned 'in isolation of those which go before and after' (2008, p.114). This would suggest that trainees therefore do not consider the full picture relating to progression something I will be keen to explore within my data findings.

### *Learning Objectives*

As discussed, planning is identified as a crucial aspect of good teaching. A fundamental aspect of lesson planning involves the use of both learning objectives and outcomes. Wood (2008) describes lesson objectives as being central to the planning process by providing a specified focus, this is a view shared by Dymoke (no date) describes lessons outcomes as the aspect of good lesson planning for which 'all else rests'.

Learning objectives are said to clearly describe what it is pupils should learn during the lesson (Wright, Ellis and Peverett 2007). In 1999, Kerry identified five domains of learning objectives as the example below demonstrates.

<b>Domain</b>	<b>Example of an objective</b>
Knowledge	By the end of the lesson students will know the names of the layers contained within the Earth
Understanding	By the end of the lesson students will understand the chemical reaction leading to oxidation
Skills	By the end of the lesson students will be able to accurately include speech marks within a piece of creative writing
Attitudes	By the end of the lesson students will have enjoyed working with others in the class
Social/affective	By the end of the lesson students will have worked successfully with other individuals beyond their immediate friendship groups

(Dymoke no date)

In reviewing the five domains, Dymoke makes an interesting assessment that is seemingly relevant to D&T teaching. She speculates that in certain lessons skills might need to be developed before progressing onto knowledge and understanding (ibid).

Though widely used within schools, a criticism of learning objectives is how they are considered to be more difficult to assess than learning outcomes as cited by Elliott below:

Objective: 'Understand the reasons for the rise of the parliamentary movement'

Outcome: 'Be able to describe at least three factors that gave rise to the parliamentary movement' (Elliott 2007 p. 62)

### *Learning Outcomes*

Learning outcomes are described as the observable link from the identified learning objective and often outcomes can be used to help clarify objectives (Bassett, Bowler and Newton 2013). Elliott (2007) describes how the learning outcomes for a lesson will determine what input the teacher will have within the lesson. Commonly learning outcomes will relate to behavioural observations. What is meant is that there will be a change in what the pupils are able to do after a lesson that can be 'perceived by a teacher's unaided senses' (Cohen, Manion and Morrison 2006 p. 115). Given this, it is crucial that learning outcomes are clear both specific and measurable enabling the teacher to

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accurately assess the learning progress made. Likewise, it is also considered important that pupils are able to recognise their learning (Titchmarsh, 2013)

A commonly applied strategy used in writing lesson outcomes is the application of Bloom's cognitive domain (1956 in Wood p.115) in differentiating what different pupils will achieve within the lesson. Using the 6 domains identified by Bloom, words relating to these are applied demonstrating increased levels of challenge. As mentioned previously, teachers must aim to use language with give a clear indication of what is required. Words that do not easily satisfy these criteria include; 'know', 'appreciate', 'be aware of', 'understand' (Elliott 2007 p.63; (Cohen, Manion and Morrison 2006 p. 115).

#### *Design and Technology Progress*

A D&T teacher's role in maximising the progress made by pupils in practical lessons is the specific focus of this study. Levinson (in Basset, Bowler and Newton 2013) identifies recognising pupils learning as a key step in planning for progression, which will now be assessed in relation to D&T. An obvious place to start this aspect of the literary review will be to clarify what is meant by a 'practical lesson' for the purpose of this study. Practical activity is not a unique concept in within D&T with many other curriculum subjects also predominantly practically based (PE, art, music, drama). Science in particular shares a similar focus on practical based learning where practical activity has been described as '*activities in which the students manipulate and observe real objects and materials*' (Abrahams and Millar, 2008). This description would seem to accurately describe pupils' practical activity in D&T when they involved in 'making' activities.

To understand what signifies progression within D&T, the term D&T capability will need exploring. Much has been written on what D&T capability consists of and how it can be assessed (Farrell and Patterson 1993; Kimbell, Stables and Green 1996; Woof, Bell and Owen-Jackson 2013). When D&T was introduced to the national curriculum, capability was considered as referring to the products or '*artefacts*' pupils made (DES/WO 1988 in Woof, Bell and Owen-Jackson 2013 p.182). Over the ensuing years capability in D&T is now recognised as a process involving pupils being able to combine conceptual qualities with procedural qualities. Farrell and Patterson describe this as involving the combination of practical activity with deepening understanding (1993). In 2013, Woof, Bell and Owen-Jackson summarised previous writing on the subject of what is to be assessed in D&T:

Pupils' knowledge about materials, aesthetics and products, we might want to add this to their knowledge of equipment and processes; their ability to understand a task, generate appropriate responses, plan and evaluate their own work and their ability to effectively communicate to others what they are thinking

(Wooff, Bell and Owen-Jackson, 2013 p.183).

Using this summary as the basis for capability in design and technology provides some clarity on what progress might consist of. It is important to recognise however that this assessment is based upon the whole design and technology experience, whereas this study is specifically focussed upon the practical, making element lessons.

#### *Design and Technology Practice*

Historically practical/making skills have been the fundamental aspect the subjects that pre-dated D&T with little focus placed on developing knowledge or understanding (Martin and Owen-Jackson 2013). In a research paper, Martin claims that though much has moved on since D&T's inception to the curriculum, many old practices remain (2013). As described in the previous section, D&T capability is now viewed much more holistically than in previous decades and this would appear to represent a common theme of approval. Zanker and Owen-Jackson (2013) for example suggest that

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D&T has moved away from the ‘demo and do’ model that was previously widespread. Likewise, Wakefield (2013) describes how the focus on learning practical skills in the ‘License to Cook’ scheme was not a positive step due to its apprenticeship model of rote learning. However, personal experience would suggest to me that Martin’s (2013) evaluation appears to be a truer reflection of D&T practice.

**Research Method**

The focus of this study is to gain a better understanding about the role of a D&T teacher within practical lessons to enable me to improve my own practice. The key piece of data I will be using as part of my research will be backdated lesson plans for practical lessons taught over the past seven months of my initial teacher training (ITT). Following my literature review, I hope to have clearer understanding about some of the key issues associated with my lesson planning for practical lessons. Any fresh insight can then be applied through a process of reflective self-evaluation leaving me better equipped to maximise pupils’ progression within my future lessons.

In total, seventeen plans are featured within my data from two separate secondary school placements. As indicated below, four lessons featured within the data were taught at my first placement school (October 2014 – December 2014) and a further thirteen at my second placement school (February 2015 – June 2015). Of the seventeen lessons, ten relate to my specialism area of D&T: Food.

School	Placement 1: Town School	Placement 2: Rural School
<b>Lesson Plans Featured</b>	4	13

All lesson plans included as part of this data collection relate to lessons involving Key Stage 3 pupils (ages 11 – 14). This age range of pupils was selected simply due to a higher amount of relevant lesson plans available than other age groups taught. Furthermore, I have also taught outside of my specialism with this age group, which may prove insightful when evaluating any results. Most critically perhaps, given the purpose of this study, all lessons featured represent practical lessons only. This relates to lessons whereby pupils spend the majority of their lesson time engaged in independent ‘making’ activities.

The applicable data collected from the seventeen lesson plans has been collated into one document in a table format. The five column headings of the table include:

- Lesson (date, year group and subject)
- Learning Objectives
- Learning Outcomes
- What the teacher is doing
- What the pupils are doing

These heading are applied to the table to reflect the information required within the university lesson plan pro forma which has been used in the planning of all my lessons during this ITT year. These headings will inform the date of the lesson, the year group and what subject is being taught, what the teacher wants the pupils to learn (objectives), how the teacher wants the pupils to demonstrate this learning (outcomes), what the teachers is planning to do himself to ensure this learning occurs (teacher activity), and finally, what the pupils are to be doing to for this learning to occur (pupils activity).

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The narrow focus of my research question means it is important to clarify that only relevant data will be transferred into the aforementioned table. The specific aim for this data collection is to evaluate and analyse my role as the teacher only whilst pupils are actively engaged in practical activity. Given this, certain information included within the original lesson plans is deemed as not being relevant at this stage. The most common exemption from the data table is any whole group demonstration commonly occurring at the start of a practical lesson. Other exemptions from the data collected include any missing lesson plans and any summative assessment practical lessons whereby teacher input is intentionally limited.

### **Participants**

This study will solely focus upon my role as a secondary design and technology trainee teacher as I undertake my ITT year at Nottingham Trent University during the 2014/2015 academic year. All lesson plans featured within the data collection have been completed completely independently and only represent my own planning considerations. In no lesson plan included is any pupil or colleague named and the two placement schools have been anonymised. Also, at no point has any backdated lesson plan been retrospectively edited to influence any findings.

### **Findings**

#### *Teacher Activity*

In nine of the seventeen lesson plans, no form of relevant information in relation to the actions of the teacher whilst pupils were engaged in practical activity was recorded. Four of these nine lessons occur consecutively at the beginning of the data collection. This signifies that in none of the lesson plans featured from Placement 1 has any relevant teacher action been recorded.

The first two lesson plans included from Placement 2 show some form of planning for the teachers activity one example being '*progress check*', however the following four lessons again revert back to not including any relevant information.

Lessons planned from 20/04/15 onwards (Placement 2) indicate a slight change in the considerations made when planning for a practical lesson with six of the remaining eight all including some detail about the planned teacher activity. Though sparse and somewhat vague, most lesson plans from this date did tend to include some indication of what the teacher might engage in. The phrases "*progress check*", "*observing progress*" and "*checking progress*" are used in five of the last seven recorded lessons, but what is meant by progress is not clarified on any lesson plan. Likewise, "Q&A" (question and answer) is also included within one lesson plan but without any specific questions being outlined within the lesson plan.

#### *Pupil Activity*

In six of the seventeen lessons nothing is recorded with regards to what the pupils are doing whilst engaged in practical activity. There is seemingly less of a pattern of behaviour in these results with two out of four blank fields recorded for pupil activity during lessons from Placement 1 and four out of thirteen blanks during Placement 2. Of the remaining eleven lesson plans of which all include something about the pupils' activity, seven include the words "*continuing*" or "*completing*" normally following a whole class teacher input.

A notable and consistent theme of the activities listed within this aspect of the lesson planning is how all entries relate to the physical activity/action the pupils are involved within the specific making task. Examples of this include '*rubbing in*', '*browning sausages*' and "*washing up*". Absent from the pupil activity section of all the lesson plans is any mention of what pupils might be/should be learning or understanding at any given point in a lesson, only what they should be doing.

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Another interesting trend the data reveal is how the seven none food lessons have notably less specific details about what the pupils should be doing when compared to the food lesson plans. In all of the seven none food lesson there is only one lesson in which a specific physical activity has been entered describing what the pupils should be engaging in.

*Objectives and Outcomes*

A consistent theme throughout both placements is how nearly half of all lesson objectives (19/39) relate to practical skills pupils should learn as exemplified below:

- 'All can use the hob safely'
- 'Most will have cut out their shape and started filing'

For most lesson plans learning objectives are included for each lesson, as are differentiated learning outcomes using the All, Most, Some differentiation approach suggested within the university lesson plan pro forma.

For many of the lesson outcomes, words have been interpreted from Bloom's cognitive taxonomy (Bloom 1956 in Wood p. 115) in order to differentiate. Lower level outcomes use words including 'identify' and 'apply', whereas higher-level outcomes use words such as 'explain' and 'analyse' as shown below.

<b>Lower Level Outcome</b> (achievable for all)	<b>All</b> will be able to <u>describe</u> the functions of protein in our diet and <u>identify</u> foods high in protein.
<b>Higher Level Outcome</b> (achievable for some)	<b>Some</b> will be able to <u>explain</u> what the terms denaturing and coagulation mean and how they affect the chemical and physical structure of proteins.

What is evident from looking at the lesson plans is how there is no indication of when these outcomes are assessed within the main body of the lesson plan, particularly those that of which cannot be simply observed in the pupils actions within the lesson and would seemingly require some form of teacher – pupil dialogue.

Lesson outcomes taken from much of Placement 2 tend to be much more task orientated, especially within ongoing project work in textiles and systems and control lessons. The outcomes in these lessons tended to relate to certain milestones that all, most or some of the pupils should have reached in the making process by the end of the lesson:

- 'All will have attached their ribbon and pinned together the two fabrics.
- 'Most will have completed above as well as tacked material together.
- 'Some will have competed above as well as begun/completed sewing seams.'

*Gaps in planning*

The document highlights several gaps in the planning of practical lesson. Of a possible sixty-eight entries, twenty have been left blank or not filled with relevant information. Eight of these gaps refer to completely blank lesson plans whereby no planning has seemingly taken place. The table below indicates how many gaps there were for each aspect of the lesson plan, excluding the completely blank two lesson plans.

	Objectives	Outcomes	Teacher Activity	Pupils Activity
Gaps	1	0	7	4

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The frequency of the gaps in planning occurs inconsistently throughout the duration of the data collection period. Within the more recent entries, there would appear to be fewer gaps.

## **Discussion**

### *Teacher's Activity Gaps*

The findings of the data collection reveal how for several lessons there are gaps within one or more of the columns. When taking an overview of my entire lesson plans it was apparent that for the all of the lessons at Placement 1, no relevant planning was included for the teachers (my) activity during practical tasks. One consideration why this may have been the case was due to the lessons occurring at an early stage within my teacher training, therefore representing some of the first lessons I had planned and taught. Given unfamiliarity with planning and teaching practical lessons, it is possible that this lack of experience and understanding of my role was a contributing factor. It might also be a reflection of how I had interpreted other teachers' input within previous practical lessons based on my experience of observations.

The first two lesson plans occurring at the beginning of my second placement do feature some plans for what I might be doing. This would seem to signify a change in approach with more consideration planned for my role. It might also be interpreted as me developing awareness and appreciation for a teacher's role in a practical lesson at my second placement school. This is however thrown into doubt as in the following three lessons I again revert back to not including any relevant information about what I am doing. This might indicate one of two things. Firstly, that in reality my appreciation about the teacher's role had not developed as previously speculated. Alternatively, complacency may have temporarily set in. Given the more concerted effort to include this information in the remaining lessons, it is fair to judge that complacency was the more likely factor.

### *Pupil's Activity Gaps*

The blank entries for the pupil's activity are not as frequent as for the teacher's activity section of the lesson plans. However, the tokenistic nature of the information that is included does not offer much in the way of an improvement. As reported in the finding, words such as 'continue', 'complete' are used but are rarely is it expanded upon in revealing what the pupils are to continue with or complete. This I believe is largely due to the nature of the lessons whereby whole class demonstrations are common, therefore pupils will be continuing from the stage they left off from or completing the demonstrated task.

The use of words such as 'continue' after a whole class demonstration might indicate a perceived assumption on my behalf that the main job of the teacher is done and the onus passed to the pupils. Again, this might go to explain why I have previously questioned my role after the initial whole class input. If my lesson plans were a reflection of my understanding about how pupils learn, it would infer that all pupils absorb the required information at the same rate and duly apply it to their work effectively. Given that this is not the case, differentiation strategies appear to be lacking.

### *Outcome focussed*

The results of the data collected provide some indication of why I had cause for ambiguity about my role in practical lessons. Perhaps the most poignant factor for discussion is how my lesson plans clearly reveal a strong emphasis on the skills pupils are able to demonstrate. As described in the context, my measure of a successful practical lesson would primarily consist of three factors: pupils completing something to an acceptable standard, pupils working independently and pupils completing a task in a timely fashion. The collection of lesson plans over my two school placements would appear to reflect this method of assessment was endemic throughout my planning.



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The fact I have adopted an outcome approach to assessment, I feel goes some way to explain why I was questioning my role in practical lessons. If my judgements of success are based upon how well a pupil rubs in flour and butter, or how neatly stitches are sewn for example, then my role will clearly be one of a passive observer of pupils learning. This approach may also leave pupils with the long-standing view of D&T being a subject simply about learning to make things.

It has become evident to me now how the successful execution of such tasks does not indicate that pupils have gained a deep understanding about the key processes or concepts involved as explained by Kimbell, Stables and Green when discussing design and technology capability:

To learn a collection of isolated, decontextualized skills will not help children recognise when they need to deploy them

(Kimbell, Stables and Green 1996, p. 83).

This has also revealed to me how it is perceivable that the learning experience by pupils who 'go wrong' and have to rectify any problems may well be left with a richer understanding of certain D&T concepts than those who effectively replicate a demonstration or instruction without encountering any problems. Recognising, evaluating and solving problems in D&T could arguably represent some of the most valuable learning within such tasks.

#### *Blank lesson plans*

The data collection highlights how for several lessons no formal lesson plans were completed. Notably, each of the blank lesson plans related to food lessons whereby the pupils would be expected to complete a dish during the scheduled lesson time. It would often be the case that the pupils would have been demonstrated the practical at hand in a previous lesson, or at the beginning of that lesson. Given this, a significant reason why no lesson plans were completed for such lessons was due to a belief that my input in that practical was to primarily to supervise and troubleshoot, two things I didn't feel I would benefit from having a physical typed up plan.

One particular example of an 'unplanned' lesson was a Year 8 pizza practical. In this specific lesson, I had demonstrated the recipe a week previously and was confident in the knowledge that the pizza making would take up the full lesson time available. Though not recorded on a lesson plan, the outcome of the lesson would have related to the how proficiently pupils repeated the skills demonstrated in making their own pizza.

One assertion that could be made from this data result is that I did not plan food lessons because it the D&T subject for which I am most comfortable and have what I perceive to be a greater amount of subject knowledge in. This might indicate a certain degree of complacency, but potentially more alarmingly, might signify that I do not recognise the value of the learning pupils are engaging in food lessons.

#### **Implications**

This study has highlighted how my lesson planning is heavily focussed on low level, skill based learning as a result of my misconceptions or lack of awareness about capability in design and technology. In a separate evaluative exercise completed prior to this study, I looked at matching Bloom's six cognitive domains to activities I considered pupils to commonly engage in within my practical lessons. Revealingly, this highlighted how knowledge recall and application were interpreted as occurring most frequently, with comprehension the lowest occurring cognitive domain. These results would appear to confirm a view of making as superseding all else.

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This is a perception of D&T practical activity is something I will need to address if my pupils are to make real progress in my lessons and develop a wider D&T capability. I have been able to identify weaknesses within my practice and now my challenge is to change my practice.

The focus of this study has featured solely on the lesson plans of a trainee design and technology teacher. It has revealed how the teaching practice at this early stage in career clearly mimics practices of old. This highlights the importance for both new and experienced teachers to consider their approaches to D&T as I have done within this study. Re-assessing and evaluating what skills, knowledge and concepts are being transmitted to pupils might be a way of doing this. Likewise, re-evaluating assessment procedures and level descriptors may indeed prove insightful about the way the D&T department and subsequently the pupils view the learning within the subject.

Teachers should begin to question what concepts are important for pupils to learn within their D&T subject area. This is not to say that multiple concepts should be thrust upon pupils at the expense of the opportunity to 'make' and interact with materials in D&T. Instead, making skills should be contextualised for pupils to enable them to gain greater understanding of the concepts at hand. This may involve pupils being taught fewer skills and processes, however this may lead to increased understanding of the intended learning.

### Conclusion

This study has been a useful tool in gaining a deeper understanding about how my perceptions of D&T practical lessons have an impact on how I plan my lessons. The lack of planning consideration towards my role within those lessons has also been insightful. The real legitimacy of any changed perceptions can really only be measured by how my practice compares in six or twelve months' time.

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