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Changing dimensions: the impact of making models on Year 10 students' understanding of Greek temples when studying Classical Civilisation

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Abstract

This study explores the introduction of 'active learning', particularly model-making, into the classroom of a mixed comprehensive state school. It focusses on the impact of 'active learning' on student engagement and skill-building (including independent-thinking, reflection and resilience). It also assesses whether model making can influence student understanding of Classical temples as 3-dimensional buildings. The findings showed that overall student engagement increased and that students developed important thinking skills. These findings applied particularly to students who are disadvantaged in some way. However, it is unclear whether students' understanding of the 3D nature of Classical temples was enhanced. Further research might assess the impact of 'active learning' on student information-retention.

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Introduction

This research grew out of a sequence of lessons with a GCSE Classical Civilisation class which is studying a module entitled 'Myth and Religion'. As part of this module, students must learn about the function, archaeology and social significance of two important Classical temples in Greece, the Parthenon in Athens and the Temple of Zeus at Olympia. In this research project, I taught about the sanctuary of Olympia and the significance of the Temple of Zeus' sculptural decoration. After this, each student built a model of the Temple of Zeus at Olympia over a series of three lessons. In this research the project's effect on engagement, student understanding and skills-development is assessed.

The research was carried out during my second Professional Placement (PP2) of my PGCE training year school. Classical Civilisation, Ancient History and Latin are available to study from Year 9 to GCSE level, and Classical Civilisation may also be carried on to A Level. For my project, I worked with a small Year 10 (Y10) Classical Civilisation class in their second year of GCSE study.

In my research lessons, students learnt about and built a model of the Temple of Zeus at Olympia. The aim of my project was to encourage students to appreciate the ancient world not just as a collection of 2D images on a slideshow, but as a 3D reality; not just as pictures in a book, but places where people lived. I also wanted to look at the impact of creativity in the classroom, as well as the efficacy and practicalities of 'hands-on' learning. There are several reasons why I chose to relate my research to the Temple of Zeus at Olympia: firstly, it fitted neatly into the scheme of work, as part of the 'Myth and Religion' option for OCR GCSE Classical Civilisation; it is also a canonical temple, which is useful for students to know well; it is also a specialism of mine, as I studied Greek archaeology in depth at University. I chose to do this project with a Y10 class because, as they are not sitting a GCSE exam this year, there is less pressure on their time. I chose to do my research

lessons with a Classical Civilisation class rather than a Latin class; this is partially because the student demographic in the Classical Civilisation class is more diverse (i.e. there are more students with Special Educational Needs and Disabilities (SEND) and the class is more mixed attainment) and partially because my ideas for a creative/active learning project were more relevant to this group.

Literature Review

My search for relevant literature was largely guided by the initial aims of my project: to assess whether making individual models of the Temple of Zeus at Olympia facilitated student understanding of the Classical world not simply as a collection of 2D images but of a 3D world. As such, I looked at two main themes in educational research; literature related to active and experiential learning and teaching using objects/software. It was difficult to find literature related to my topic as Classical Civilisation is a minority subject. Consequently, I broadened my search to include research carried out within other subjects as well as Classical subjects.

Active Learning

In the critical literature I read for this project, no universal definition for ‘active learning’ is given. The term ‘active learning’ is used somewhat interchangeably with ‘experiential learning’. The articles I read, particularly *Experiential education through project based learning* (Efstratia, 2014) and *Active learning increases student performance in science, engineering, and mathematics* (Freeman et al., 2014), share an interest in the efficacy of constructivist methods of learning, i.e. methods in which students ‘construct’ their own understanding. I will refer to literature about both active and experiential learning in my literature review and will use both terms interchangeably.

Freeman et al. (2014) gives a quantitative analysis on the impact of ‘active learning’ and is rooted in Science, Technology, Engineering and Mathematics (STEM) subjects. This focus on quantitative data may be due to the objectivity that can be applied to STEM subjects, (while the humanities remains relatively subjective); this objectivity allows for larger scale studies to be undertaken (i.e. within nations rather than individual classes) with a lesser demand for researchers to carry out quality control within their findings. This article is also rooted in higher education (post-18 education) in the USA. Because the available research is rooted in subjects and educational contexts

that are different to my own, I prefer data-driven research; it is more objective and consequently, more easily applied to other subjects.

Freeman et al. (2014) assess whether active learning increases student performance in STEM subjects. The research was commissioned to address the 20% decrease in student interest in STEM education at the start of an undergraduate course in comparison to the end. It “metaanalyzed... data on examination scores or failure rates when comparing student performance in... (STEM) courses under traditional lecturing versus active learning” (ibid., p. 8410). This study found that “under active learning... average examination scores improved by about 6%.... and that students in classes with traditional lecturing were 1.5 times more likely to fail” (ibid.). These results demonstrate a double-benefit of active learning; student recall and/or application of information in an examination context is improved by active learning, as is the performance of students who are at risk of failing. I also found that ‘active learning’ supported lower-attaining students, as I will discuss in my own investigation.

This study also makes the point that the decreased fail rate of students under an active learning programme entails an equal decrease in tuition fees wasted. The data suggests that, of 29,300 students, “3516 fewer students would have failed... [which] translates to over US\$3,500,00 in saved tuition” (ibid., p. 8413). Although the financial stakes in the US college education system are much higher than the UK secondary system, it seems that active learning is a more cost-effective mode of teaching. While active learning does not necessarily ‘save’ on teaching time, it does mean that more students pass for every pound a school spends.

Although this study is concerned with non-Classical subjects, it is still concerned with a range of subjects (science, technology, engineering, and mathematics). Subject content within this range is not identical yet the results of this study “hold across the STEM disciplines” (ibid., p. 8410). That this study is cross-curricular makes its findings particularly pertinent to my research; I applied cross-curricular skills, including artistic, mathematical and engineering skills (i.e. building the temple), to a Classical subject.

The conclusions of this research seem robust; the data is broad, since it concerned 29,300 undergraduate students in different departments and institutions; it measured scores on “identical or formally equivalent examinations, concept inventories, or other assessments” (ibid.); and it mitigated its findings by calculating fail-safe numbers and analysing funnel plots. There are,

however, limitations to this study – despite its robustness and applicability. For example, it does not answer questions about the ‘intensity’ or ‘type’ of active learning that is most effective; the data it drew on was largely quantitative rather than qualitative and, as such, did not allow for a detailed analysis on this level.

Efstratia’s article cites different variations of experiential and project-based learning, including “Dewey’s “learning by doing” theory.... [and] Montessori’s theory of observation and empirical learning and Bruner’s discovery learning” (Efstratia, 2014, p. 1257). Project-based learning is the ‘kind’ of experiential education Efstratia is concerned with in this article. This fits well with my research; the lessons were rooted in project-based learning, in that students were given a small-scale project – to build a temple – which they undertook over a period of 3 lessons. While Efstratia gives no data relating to the measured effectiveness of project-based learning or experiential education more generally, his outline of the processes of project-based learning was useful in planning my research lessons; he states that project-based learning requires “real-world problems [to] capture students’ interest and provoke serious thinking...” (ibid.), in which the teacher “plays the role of facilitator, working with students to frame worthwhile questions, structuring meaningful tasks, [and] coaching knowledge development...” (ibid.).

Efstratia talks about the acceptance among academics that project-based learning develops “21st century essential skills... such as problem solving and decision making” (ibid., p. 1258), alongside other benefits such as “developing... emotional, social elements apart from cognitive.... [and] reduction of student’s anxiety” (ibid.). Efstratia cites no evidence to support these claims, nor does he specify in which educational contexts these claims may be made (e.g. at undergraduate level? secondary level? in which subjects?). Nevertheless, I witnessed some of the advantages listed, particularly problem-solving and decision-making skills, within my research lessons. At first, my students were hesitant to make their own judgements (i.e. to exercise problem-solving and decision-making skills) and preferred to be instructed. This hesitancy decreased over time. Their initial hesitancy is perhaps due to their unfamiliarity both with me as a teacher and project-based learning. In addition to the advantages cited by Efstratia, I also found student engagement increased, particularly among the most disengaged students in the class.

The lack of literature, particularly of data-driven research, is explained by the difficulty of assessing the efficacy of experiential learning environments. This difficulty in assessing learning- and skills-

outcomes is something that affected my research lessons. Gosen and Washbush (2004) focus on these difficulties, pointing out that “assessment is a necessary complement to purpose” (p. 271). They recommend “objective and rigorous research” (ibid.) with “pretests and posttests, treatment and control groups, experimenter control of treatment variables, and random assignments to groups” (ibid., p. 281). While desirable, such demands for measuring the outcomes of experiential learning were neither practical nor possible in my circumstances. The possibility of a control group does not exist; there is only one GCSE Classical Civilisation class in the school. Nor did the scheme of work allow for pre- and post-testing; I had only a five-lesson window. Gosen and Washbush warn that “‘feel good’ measurement” (ibid., p. 277) is an ineffective way of measuring learning. The authors stated that measuring enjoyment does not equate to measuring learning; they cited no data to disprove this notion. The article, it seems, suffers from the very same problem it laments in the research of others; it is not sufficiently backed up by data.

Teaching using objects, software and technology

The subject-specific literature I read, such as Thorpe (1992), Nevin (2015) and Parton, Newton & Newton (2017), concerning the use of software, objects and technology in teaching was less data-driven. It also focusses largely on experiences within one school or one class, rather than national or international data. Some is drawn from experiences in Secondary schools (Thorpe, 1992), undergraduate level (Parton et al., 2017) or both (Nevin, 2015). The articles I read are also very broad in subject matter, as there was no exact match for my research; they therefore include studies about object-centred and museum-style learning, the use of archaeology-based software in teaching and the potential crossover between Classics and Design Technology.

My temple building project was unusual in that it incorporated elements of Art and Design Technology. Thorpe’s article *Historical Technology* (Thorpe, 1992) also deals with such cross-curricular learning. At her school, an 11-16 comprehensive, she ran an Historical Technology module as part of GCSE technology, with a focus on Roman Building and Engineering. Evidently, times have changed; there is no longer an Historical Technology module in GCSE technology nor, with the advent of the internet, are Thorpe’s difficulties with sourcing and displaying images any longer so acute. However, I think that some of her observations still hold value today and correlate well with my own. Firstly, she designed the Historical Technology on Roman Building and Engineering to appeal to the “Special Needs pupils and... the high flyers” (Thorpe, 1992, Course

content, para. 1). I also found that the temple building appealed to a range of attainment levels, with some otherwise disengaged students putting in very impressive work. Thorpe's "accent... on problem solving" (Thorpe, 1992, Problems and pitfalls, para. 1) links with the "21st Century skills" (Efstratia, 2014, p.1258) that Efstratia says can be developed by project-based learning. It was, however, something I found my students struggled with; their lack of resilience meant that they need much cajoling whenever something went wrong and their lack of independence meant they needed a lot of instruction. However, Thorpe's observations were built up over years which allowed her to coach such skills and confidence; perhaps if projects like mine were more common, students would begin to feel more comfortable with independent decision-making and problem-solving.

Another study relating to problem-based learning used objects to engage students in Asian art (Parton et al., 2017). In this study, students at Durham University were required to pick an object from the University's Oriental Museum and carry out in-depth research about the object. The module is examined on a logbook and a podcast, both centred around the object. This form of assessment is striking; if I applied this attitude towards assessment in my lessons, taking the temples as the source of a students' grading, the attainment dynamic within the classroom would be drastically different, with many typically lower-attaining students easily holding top marks. Perhaps we should be rewarding students for a range of different skills; this would be more rewarding for students who struggle with written tasks. The impact on attainment may well be higher than it would be at Durham University; at Durham, students are older, more mature and typically high attaining anyway, and so the gap in attainment is smaller. However, there is a crucial difference between universities and secondary schools; universities can set their own exams, while secondary schools are bound by national examination boards. Given that only written skills are tested in GCSE Classical Civilisation, it seems incongruous – although perhaps fairer – to grade students on this variety of skills. Although there is nothing to prevent teachers grading in such a way, the upheaval, both in logistics and in thought, required to create a certified alternative assessment makes any change seem unlikely. Just as Freeman et al. (2014) reported increased attainment under active learning, this study reported high performance; attainment in this module was very positive, with all students passing the module and 18 of the 22 students achieving a First-class mark.

A national syllabus also makes the student-autonomy required by this module at Durham difficult to achieve at secondary level. Such autonomy was found to act as a "powerful motivator... [which] also fosters creativity, cognitive flexibility and self-esteem" (Parton et al., 2017, p. 149). Such

benefits would impact most positively on disadvantaged, disengaged or SEND students. This is surely more pertinent in a more deprived setting than at Durham University; and for such settings it is therefore all the more important to allow for autonomy, albeit on a micro-level. For example, if time allowed, teachers could allow students to pick an object (perhaps tied in with a museum trip) and research it thoroughly, culminating in a presentation. This would tie Classical studies in with “21st century essential skills” (Efstratia, 2014, p. 1258) required by employers and universities. It would also allow students to exploit matters of personal interest, as in the study at Durham; here, “60% of students... advanced personal and cultural connections as the motivating factor” behind their research (Parton et al., 2017, p. 151). Because of the diversity of the Ancient world, a range of students from diverse backgrounds would be able to personally engage with either a social, economic or cultural aspect of Classics. The huge variety of student interests that can be sparked from Classical material is evident in Hunt’s article *Teaching Roman Food at Key Stage 3: Building Knowledge Through an Enquiry Question* (Hunt, 2016) in which a discussion on Roman food instigated interest in the fertility of Campanian farmland!

Relating objects to matters of contemporary interest can also help Classics ‘come alive’ for some students, if we choose the objects we are looking at carefully. This is true for the Panoply Vase project, in which select scenes from Greek vases are animated. They are chosen on the basis of their inherent interest to students (e.g. athletics, the gods and the Trojan war feature heavily), and their potential for animation. They can be treated both as a “springboard” (Nevin, 2015, p. 34) or “as a focal point for a discussion” (ibid., p. 35) but they are used most effectively as inspiration for a ‘story-boarding’ project. The vase animations, and particularly the activity of ‘story-boarding’, encourage students to engage with the object (in this case, a vase) and the story it tells, rather than viewing it as a static artefact. Nevin says that this activity is effective because it “draws on the motivating power for outcome-orientated learning. The students are motivated in their analysis of the artefacts by the fact that they are going to *do* something with the images...” (ibid., p. 36). My research lessons also tried to encourage student engagement with the ancient world by *doing* something with it. I agree with Nevin that, when students interact with the ancient world in this way, learning about ancient objects “ceases to be a passive experience; instead it becomes one of creative engagement, which strengthens their understanding of the artefacts...” (ibid.); again, this links into active and constructivist theories of learning. While Nevin gives no concrete examples of it, my students certainly appreciated the “subjective experience” (ibid.) that engaging with the

ancient world creatively requires; this can be seen in their feedback about the individual difficulties involved with making their temples.

Other software has been developed to help students understand artefacts, as well as archaeological sites. For example, interactive models have been created at the University of Pittsburgh which reconstruct the Temple of Isis in Pompeii, a prototype Temple of Horus and the Tomb of Lady Hao at Yinxu. As well as being useful in conveying spatial and visual information, such as the layout of the temple and architectural realities e.g. the “interplay of lines of sight and light and shadow” (Vadnal & Jacobson, 1999, Temple of Isis, para. 2), it can also be used to “attach non-spatial information to ... objects in the model in a vivid and concise way” (ibid., Introduction, para. 1). Non-spatial information can include “text, sound, animations or other such tools” (ibid., Abstract, para. 1). For example, in the model of the Temple of Isis, statues stand in certain parts of the temple model and a chant is activated when the user ‘visits’ the altar at the front of the temple. While it was not possible for me to recreate sounds in my research lessons, nor does any such model of the Temple of Olympia exist, my students did recreate the sculpture in their models by drawing/modelling. It was useful to attach these ‘objects’ to their archaeological context, as in the Pittsburgh models, but I think the process of making/drawing the sculptures was even more valuable in terms of engaging the students in a non-passive way.

Research Questions

In the remainder of this study, I focus on the following research questions:

RQ 1 Did building models of the Temple of Zeus at Olympia increase student engagement?

RQ 2 Did temple-building help students understand the space and/or physical reality of Classical temples?

RQ 3 What kind of skills did model-making develop?

Teaching Sequence

My research lessons took place over five lessons – two weeks – immediately after the February half-term. Students normally have three lessons a week, so planning for five lessons allowed one

contingency lesson. These lessons are usually co-taught by two Classical Civilisation teachers, but I temporarily took over from both teachers for my research lessons. We spent two lessons learning about the Temple of Zeus and sanctuary at Olympia, then we started the temples. We spent the best part of three lessons building.

I carried out my lessons at this point because it fitted well into the scheme of work; the regular Classical Civilisation teacher at my school had just taught the class about the Parthenon, and so learning about the Temple of Zeus at Olympia, another Classical temple, made sense. This also meant that students had a basis for learning about Greek temples; they knew the basic layout, functions and style. During the first two research lessons, we learned about the sanctuary and sculpture at Olympia. For the following three lessons, we focussed on building our temples; for this, students were provided with straws (columns), a polystyrene base and white card, with a template, for the main building.

Due to an additional A Level Latin placement before half term, I had not met my research class very often before; I had observed them only twice. I had never taught them before. This was not ideal, as the students were not used to me or my style of teaching, but the scheme of work required it.

Our lessons were affected by adverse weather conditions; in the final lesson, in which students finished their temple-building and I conducted an informal group interview, three out of nine students were absent (Urania, Faunus and Jupiter).

Ethics

All research activities took place within regular lesson time and were permitted, in advance, by both teachers who regularly take this class. In addition, this study abided by the guidelines on educational research recommended by the British Educational Research Association (2011). These guidelines were discussed both with the regular teachers of this class and my supervisor.

Given that all research took place within lesson time and was largely observational, my students were not informed that I was completing formal research on these lessons. I chose to do this as I did not want to distract from the lessons or the purpose of the tasks, nor did I want students to feel pressured or self-conscious of their work. This decision was made in conjunction with the regular

class teachers; we agreed that the self-consciousness of the students in formalised situations would hinder students' responses and honesty.

In the instance of the interview, I simply explained to students that I would be audio-recording their responses in order to better hear their feedback and improve my teaching practice; they had the right to withdraw at any point from this interview.

In this report students have been anonymised by using pseudonyms.

Methodology

This is an action research project. Action research "is located in the real world, so that it becomes a form of real-world research" (McNiff, 2016, p. 12); in my situation, this meant doing something different with a class and observing the effect, with a focus on engagement, understanding and skills.

I particularly chose this action research project – temple building – because I was interested in introducing active/creative learning in the classroom. I chose to work with this particular class for two reasons: firstly, it fitted within the scheme of work and would not disrupt their learning; secondly, some students in the class were disengaged and I hoped to combat this through active learning. Given that I wanted to change, rather than observe, the classroom situation, I chose to do action research rather than a case study. In my action research, I hoped to show a "causal relationship" (McNiff, 2016, p. 16) between my research lessons, namely building models of Greek temples, and student engagement, understanding and skills-outcomes.

Despite my best efforts, my research is limited. The class I worked with is small and not necessarily typical; there was no opportunity for control groups or pre-/post-testing and some of my data collection methods are subjective. Rigorous and extensive research would need to be carried out to prove, or disprove, the findings of this paper. This may involve the generation of quantitative data, which I have not produced. The conclusions I reach about my research questions, which focus on increasing engagement, improving student understanding of the Classical world and developing essential skills, apply to this class alone. They may hold true of other classes with similar demographics and taking part in similar activities, but this is beyond the scope of this paper.

Research Methods

In order to address my research questions in relation to my lessons, I worked with qualitative data. The qualitative focus of my research is not unusual; Koshy states that, given the analytical nature of the research, “an action researcher would predominantly be working within a qualitative paradigm” (Koshy, 2010, p. 80). I employed three methods of data collection: observations (both mine and my mentor’s); documentary evidence, and an informal group interview.

The informal group interview was carried out at the end of the last of my research lessons. As such, only six of nine students were present. I had planned questions in advance and recorded student responses; I have transcribed these. I chose to use a group interview to gather data on my research for several reasons. Primarily, the small nature of the class (only six present for the final lessons) allowed me to talk to all students about their experiences; it did not seem necessary to make the interviews individualised. Secondly, I wanted a method of data collection that was informal; I felt that this might generate the most honest answers. I also wanted to reduce any anxiety within the classroom; students in this school are not necessarily accustomed to being questioned about their learning – let alone to feel confident in criticising it – and I did not want to induce additional stress for them.

Documentary evidence includes the final products, the temple models. It also includes book work, in which students briefly reflected on their experiences in building the temples. It is not extensive but allows an insight into the practicalities of and skills involved in temple-building. I have included photographs of any work produced, which I discuss. Although the temples that students built were not graded, I did mark the bookwork that was carried out in my research lessons. I did not give grades when I marked their books but wrote comments about what students had said. I chose to use the temple models as documentary evidence primarily due to the nature of this project; it was a creative and constructive project which requires images to give a fuller understanding of the outcome. The models are also partially reflective of student understanding of Classical temples, which is something I aimed to assess. I used their books to complement this assessment of their understanding, as well as to demonstrate the difficulties they had and the skills they were required to use in building their temples.

I used observations, both mine and the teachers’, to convey elements of the lessons not conveyed by documentary evidence, such as the atmosphere of the class. As I was working with two teachers

who co-teach the same class, the length of teacher-made observation notes varies. Mine, however, are all similar in length and detail.

When planning this series of lessons, I felt for several reasons that it was unnecessary to ask students to complete a questionnaire. Firstly, it formalises proceedings in a way that, as I have already explained, would heighten student self-consciousness and hinder honesty. Secondly, it seemed to me that qualitative data – which, in this case, seemed paramount – could be more easily attained through direct conversation. The main downside to my approach is that questionnaires, when done anonymously, can foster honesty; in hindsight, perhaps anonymous written responses to the lessons may also have been valuable.

Data and Findings

Table 1 presents the class data (anonymised) of the student's target level and whether they are also studying Latin. Table 2 presents class engagement based on my own assessment.

There were two boys and seven girls in the class. While small, the class is varied in terms of attainment; most students are predicted 5-6, while Maia is predicted 2. The class, in comparison to the wider school cohort, has a lower than average proportion of students who have English as an Additional Language (EAL) or SEND status.

Student	Target	Latin
Ariadne	6	Y
Rhea	5	N
Maia	2	N
Urania	6	Y
Alcmene	6	N
Juno	6	N
Merope	6	N
Jupiter	6	N
Faunus	6	N

Table 1: Y10 class data (anonymised)

Student	Engagement	Target
Ariadne	High	6
Rhea	Low	5
Maia	Low	2
Urania	High	6
Alcmene	Mid	6
Juno	High	6
Merope	Mid	6
Jupiter	Low	6
Faunus	Low	6

Table 2: Y10 class engagement based on my own assessment

Most students in this class have had no formal access to Classical Civilisation at school before choosing their GCSEs. Two students in the class (Urania and Ariadne) also study Latin (see

Table 1). This grants them more confidence in talking about the ancient world, particularly the Romans. While this does not affect my project significantly, which is concerned with a Greek element of the course, it does impact on engagement. As Table 2 illustrates Ariadne and Urania, the Latin students, are the most engaged in the class. This correlation with the study of Latin and engagement is perhaps due to an increased interest in and confidence talking about the ancient world. However, the level of engagement in this class does not correlate with attainment; 3 of 4 low-engaged students are targeted 5-6 (again illustrated in Table 2).

Temple Building and Beyond – A Variety of Active Learning Activities

In my first lesson, I introduced visual activities to encourage creativity and imagination. I intended this to act as a warm-up to temple-building. The activity I set involved reading a section of Pausanias' *Description of Greece* (5.13.8-5.14.1). Pausanias is an important Greek writer who lived in the 2nd Century AD under Roman rule and recorded his travels around Greece. In this particular passage, Pausanias describes the ash altar of the Temple of Zeus. Students were asked to highlight the important information about the altar, and then draw a reconstruction of what they thought it would look like. I made it clear that there were no right or wrong answers; it was a matter of interpretation. I hoped that, by being cast as archaeologists, my students would feel empowered.

Some mid-high-attaining students (Jupiter, Urania and Ariadne) took to this task very well (Figures 1-3 respectively). Other students were reluctant to put themselves out there and simply copied from other students (Figure 4 has been copied from a section of Figure 3). Interestingly, the student who did the copying always makes excellent notes and written responses but is very hesitant to do anything other than writing. Some students, particularly Maia, found this task too hard. I adapted the task so that she simply highlighted important information from the passage instead.

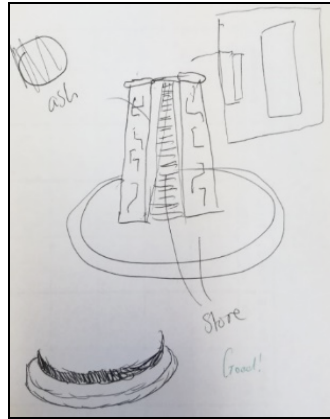


Figure 1: Jupiter's work

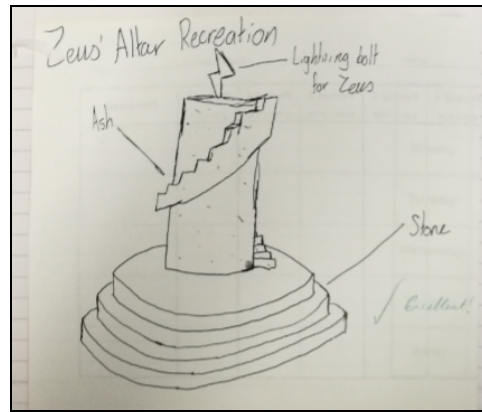


Figure 2: Urania's work

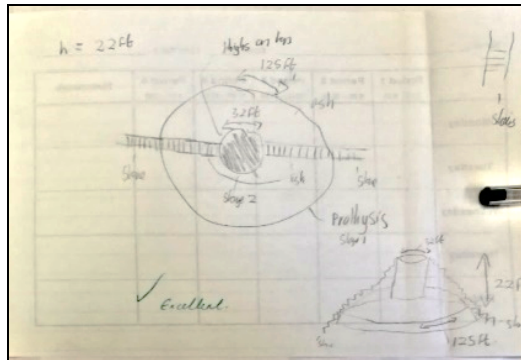


Figure 3: Ariadne's work

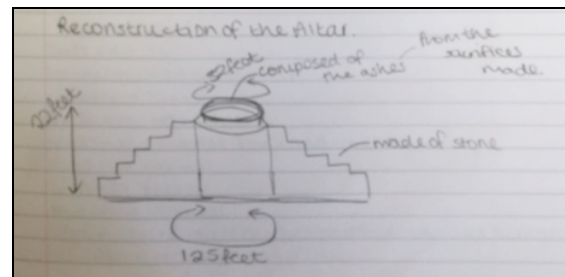


Figure 4: Copied from part of Figure 3

Other visual activities I tried with the class included a starter activity on pediments in the second lesson. For this activity, cut-outs of the pedimental sculpture of the east pediment at the Temple of Zeus were put on students' desks. As they came in, they all picked up their pictures and discussed whose picture was 'coolest' (an unanticipated discussion!).

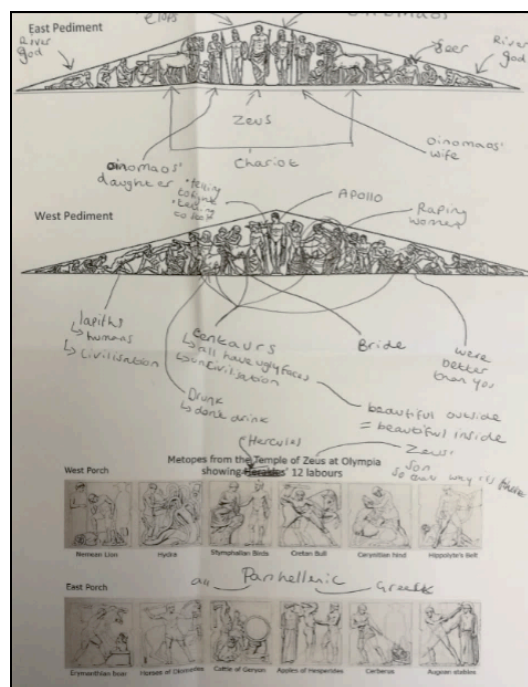


Figure 5: Example of labelling pictures of pediments

Once all students had arrived, they were told about the triangular shape of the pediment and then instructed to order themselves in a line, with the pediment shape in mind. Maia was reluctant to join in and positioned herself on the end (she was Hippodamia, a central character) until I told her to find another figure in the pediment she resembled (Sterope, a similar-looking character who had been correctly positioned towards the centre) and to position herself accordingly. I questioned students about their reasoning for the order; they had used height to judge who should be in the centre. I also questioned students about what kind of person would be in the centre; they answered that the most important person would probably be in the centre

and, when probed with further questions, concluded that it seems likely a god would be central. Students then sat down and I told them the Pelops-Oenomaus myth. Students applied their knowledge from the pediment activity when labelling pictures of the pediments, which I simultaneously labelled on the board. We could then apply this knowledge to the west pediment once the students knew the story; for example, they easily found Apollo. With this base knowledge, students discussed more complex ideas. For example, in discussion of the west pediment, Rhea – who is usually disengaged – made an excellent point about the representation of civilisation and ‘un-civilisation’. They also reflected on the significance of the myths on a Pan-Hellenic temple; for example, they talked about Oenomaus’ role as a warning against cheating at the Olympic games. The notes students made outlined ideas we had in the discussion, without going in to depth. Figure 5 illustrates a representative sample of labelling pictures of pediments from a mid-attaining student, Juno.

Another ‘active learning’ task I tried as the starter of the third lesson was to stack five chairs at the front of the room. I asked students to move the chairs as a group. At first, they simply dragged them altogether. I then had to elaborate; I told students the chairs were made from stone and it would not be possible to drag them along without damaging them. I then had to specify that the stone was very heavy and could not be taken all at once. Then the students worked as a team to move the stack,

taking one chair at a time. I was trying to get them to visualise the problem of transporting stone columns from quarries to the site at Olympia. I am not sure the activity made this entirely clear, but it was followed up with some pictures on the board of maps and of the staggered column drums. This reinforced their understanding. Again, the frequently-disengaged Rhea made an excellent contribution in moving the chairs, taking the lead and delegating tasks to other students. Jupiter, who is high-attaining but usually quiet in class, was quick to point out to others that both the chairs and column drums were stacked.

The first task of temple-building was to cover the polystyrene bases with tissue paper; most students did this without a qualm, with only Alcmene – the high-attaining but reluctant student – requiring a new sheet. While students were doing this, I showed them my model temple. Students then had to mark out the position of their columns, ensuring that the columns were placed equidistant and that they would be able to fit the correct amount on the polystyrene base (13x6). Maia found it difficult to evenly space her columns. I helped her by measuring out a rectangle and assisting her columns in spacing her columns; once she was shown how, she could get along with it alone, but needed extra support and a vote of confidence to begin. Once students finished this, they were instructed to create holes in the base using the pointed end of a pencil; this would allow for the easy insertion of the straw columns. Most students got to this point by the end of the first ‘construction lesson’.



Figure 6: Columns alternate colours

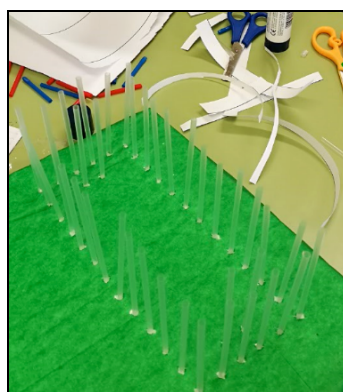


Figure 7: Columns same colour (Faunus)

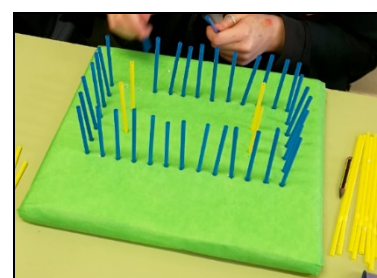


Figure 8: Colour selected by column position (Rhea)

The columns (straws) then had to be trimmed to size. In this task, I allowed students to use their own judgement about how long the straws should be. I left a picture of a reconstructed Temple of Olympia on the board, to help them in their judgement. The straw-columns were multi-coloured, as this was the only material available to me. Students did, however, comment that the ancients would

have painted parts of their temple (I showed them the column-painting at Paestum in response). The coloured straws also allowed them to make an aesthetic choice as to which colours(s) they wanted to use and where; this varied hugely, with some students alternating colours, some using all the same colour and some choosing the colour of column based on the columns' position (see Figures 6-8). The columns, once trimmed, were fixed into the base. This was difficult, because of the nature of polystyrene; if students had not pierced it with their pencils enough or in the right direction, the straws often bent or went in at an angle. Some students seemed to do better at this than others, particularly Faunus and Rhea, see Figures 7 and 8, respectively; their straws were more orderly, both in their colour schemes and in their position. Neither Rhea or Faunus are particularly high-attaining. However, high-attaining students, such as Alcmene and Urania, seemed to fret more about their design; this could be that this kind of project does not play to their skill set or interests. Equally, it could be that they were too focussed on meticulous detail; they seemed less able to differentiate between the level of detail required for written and practical work. It was, however, found to be difficult by all; students unanimously answered that they found aligning the columns the most difficult part of the building process.

One student, Faunus, got on to modelling the main building of his temple by the end of the second lesson, but most only stuck their template pieces onto card. At the beginning of the final 'construction lesson', I did a short demonstration of how to assemble the main building. The tables were arranged in a horseshoe shape which allowed me to convey this information. Some students had to make adjustments to their template so that it would best fit within their columns; in hindsight, it may have been better to build the temple building first. I was conscious of time, and so I cut out the bases for the roof of each student's temple. Students then created the rooftop; most balanced this on the roof base, but Alcmene insisted on securing it with sticky tape.

For those students who finished early, I first asked them to label the different parts of their temple. This recalled earlier learning. I then encouraged them to draw on the pedimental sculpture, referring to the images in their books. If students finished this, they were allowed to model their own cult statue, applying earlier learning about Phidias' statue of Zeus to their own design. For this, students used a white modelling dough which I had made with silver glitter flecks in it to reflect the crystalline nature of marble. Although some students did not make a serious model, other students were able to sensibly reflect on why the silver glitter was in it when asked.

Effect on Engagement

The effect on student engagement was mixed but I would say there was an overall increase in engagement, particularly among some students I had previously assessed as low engagement (see Table 2). For example, Maia was increasingly engaged and asking for help whereas she would normally switch off; this was evidenced in our working together and her active contribution in the group interview. My mentor observed a similar occurrence, commenting that “Maia [is the] most engaged she’s been all year...”. Another chronically disengaged student, Rhea, also seemed to enjoy active learning; my mentor overheard her saying to her friends “This is actually quite fun.”.

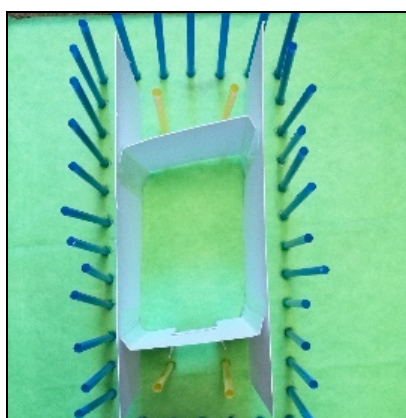


Figure 9: Alternative view of Figure 8



Figure 10: Rhea's finished temple

Her finished temple (Figures 8-9) was also the best in the class, although she did not get onto any extension tasks. The neat finish to Rhea's temple is uncharacteristic of her written work; her presentation is often not good and, as Rhea spells things phonetically, her meaning is not always forthcoming. Unfortunately, due to bad weather conditions, some students did not get to finish their temple projects (Urania, Faunus, Jupiter). Despite this, I was impressed with Faunus's pace (he caught up on two lesson's worth of building within one lesson) and his continued self-application (he usually is very easily distracted). I feel that this activity was particularly good at engaging students who are usually disengaged. It also allowed students to get credit for class work that was not strictly academic/writing-based; this allowed them, perhaps for the first time, to excel and be role-models in Classical Civilisation lessons. For such students, I think this is a valuable experience and a confidence boost.

However, some typically high-attaining students were less engaged in this project than in more typical lessons. I got the sense that they did not take it seriously or think that it was serious learning. This may have been impacted by their perception of me; I had never taught them before and was open with them about my status as a trainee teacher. One such student is Alcmene, who made excellent notes but who did not seem to be engaged with the model-making. I also think that it was difficult for such students to accept that others found model-making easier.

Much like Thorpe (1992), I believe this project supported the learning of a variety of students. In fact, from my observations, it seems the low- and mid-attaining students benefitted the most. As I have already mentioned, this project was good in allowing skills other than written work to be cultivated, displayed and appreciated. In my experience, the variation of tasks within a lesson is valuable; it prevents students getting bored and allows students to showcase – and feel credited for – a variety of skills.

Skill Development

Students demonstrated self-reflection skills, in their ‘exit tickets’, in which they wrote down the most significant difficulty they had in building the temple. For example, one student cited “putting the column points” (i.e. measuring out the columns correctly) as a significant difficulty for her. Students also reflected on their learning in the group interview, when they gave a mark out of 10 how difficult the project had been. It is a valuable skill to be able to reflect on your learning and clarify this reflection by specifying what was most difficult.

I think the repeated use of problem-solving skills helped to build students’ confidence in their own ability, which in turn enhances their resilience. This is particularly true of Maia who had to be cajoled into continuing with the project several times, but who seemed to become more confident in her own abilities as time went on. This is evidenced specifically in her reluctance to draw the altar from a description in the first lesson, but her increased confidence and engagement by the fourth lesson.

Students also showed progress towards a more positive mindset. In the ‘exit tickets’, students commented on how they overcame their difficulties in this project. For example, one student commented that “spacing the columns out is difficult, as well as getting them centered [sic]” was a significant difficulty. He said that he overcame this “by using a ruler and doing maths to find the

centre and measured the temple from there.”. Not only does this self-reflection and self-articulation of problem-solving skills encourage a growth mindset, but it also highlights the interdisciplinary advantages of such a project. Students also hypothesised about the difficulties faced by the ancient Greeks and their solutions; for example, Urania noted in her exit ticket that the Greeks would find it difficult “getting the materials – marble”. This contextualised the difficulties of the students.

Space and Reality: Olympia in the Classroom

The ‘exit tickets’ encouraged students to appreciate the physical realities of building a Classical temple, by comparing their experiences with those of the Ancient Greeks. For example, if we take Urania’s comments in, she gave her main difficulty “putting the columns points” , by which I think she meant piercing the polystyrene so that her columns were upright. She overcame this difficulty by working carefully. She then cites a difficulty that the Greeks would have had, like “getting the materials...”; evidently, she did not feel the Greeks would have had the same problems as her, due to the different nature of materials. If we look at Maia’s exit ticket, she said “its [sic] difficult to measure it acturately [sic] and line it up”. She thought she was less equipped than the Greeks in doing this “because their [sic] professional architects and im [sic] not.”. While simplistic, I think this is a fair observation; she has acknowledged that the space of a temple is difficult to recreate and comprehend without specialist skills.

I think the line-up pediment activity helped students understand the layout and architectural demands of the pediment. I used the activity again at the start of the third research lesson. In this activity, student recall of information about the story was impressive. The same is true for the ease with which they re-assembled the order in the following lesson (despite being different ‘characters’ this time). Perhaps in future, it would be useful to use physical theatre to convey information about the spatial reality of temples; for example, students could be columns and rearrange themselves depending on how many columns were in each temple. Such an activity would require, however, a much bigger class.

Besides the ‘exit tickets’ and my own observations, I have no evidence that the temple-building process helped students to appreciate the physical reality of a temple; to them, it may well still seem that the Temple of Olympia is confined to a 2-D image in a book. It would have been very difficult to collect data on student perception of the 3-D reality of the Temple of Zeus, partly because it is a

complex idea to articulate and partly because I deliberately did not use questionnaires as a method of data collection.

Conclusion

Despite there being no literature that directly matches up to my project, I believe my findings to fall within the broad conclusions of the literature I discussed earlier in this essay; active learning – in my case, temple-building – seemed to increase student engagement. It also encouraged students to develop useful skills, one of the active learning benefits mentioned by Efstratia (2014), including resilience, reflection and problem-solving. Due to limited lesson time, I was not able to assess whether active learning improved exam results as shown by Freeman et al. (2014). Neither was I able to carry out “objective and rigorous research” (Gosen & Washbush, 2004, p. 271), using the pre-/post-test and control groups recommended by Gosen and Washbush; as such, any conclusions I draw are drawn tentatively and are subject to further research.

In future lessons, both with this class and with others, I hope to continue to develop creative ways of engaging with the Classical world that do not rely solely on reading a textbook. As suggested earlier, physical theatre could be introduced to convey temple space. Since teaching my research lessons, I have also had this class design job advertisements for Vestal Virgins and design/write a post-card home from the Temple of Portunus in Rome. I believe this variety encourages students to be more creative, more open to enjoying learning and to build personal qualities such as resilience. I will continue to use ‘active’ and creative activities in my future career; my first teaching post is at an all boys’ free school which, as stated in its own literature, places an emphasis on *active learning, deep thinking and enquiry*.

Of course, such skills are almost impossible to measure objectively and in a tangible way. Inevitably, further research into the development of these qualities in students will be largely observational and take place over an extended period of time. Such research could be backed up by summative assessment. Indeed, this may be a necessary evil; since it seems unlikely examination boards will move away from traditional written papers, these are the standard by which our students are judged.

In addition to the learning theory and the research, my students had fun in these lessons. To many, this may be a moot point; school is, of course, primarily a place of learning. However, my

relationship with this class is now a positive one; we are able to try different things in lessons without much resistance and the atmosphere is always positive. My positive relationship with this class creates a safe, creative and encouraging learning environment. Of course, the observation that my class had fun does not stand up to scientific scrutiny, yet I feel it an observation worth making.

References

- British Educational Research Association (BERA). (2011). *Ethical Guidelines for Educational Research*. Retrieved August 29, 2018, from <https://www.bera.ac.uk/wpcontent/uploads/2014/02/BERA-Ethical-Guidelines-2011.pdf>
- Department for Education. (2016). *Schools, pupils and their characteristics: January 2016*. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/552342/SFR20_2016_Main_Text.pdf
- Efstratia, D. (2014). Experiential education through project based learning. *Procedia - Social and Behavioral Sciences*, 152, 1256-1260, doi: 10.1016/j.sbspro.2014.09.362
- Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., et al. (2014). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences Jun 2014*, 111 (23) 8410-8415. doi: 10.1073/pnas.1319030111
- Gosen, J. & Washbush, J. (2004). A review of scholarship on assessing experiential learning effectiveness. *Simulation & Gaming*, 35(2), 270-293. doi: 10.1177/1046878104263544
- Hunt, S. (2016). Teaching Roman Food at Key Stage 3: Building Knowledge Through an Enquiry Question. *Journal of Classics Teaching*, 16 (32), 50-52.
- Jacobson, J. & Vadnal, J. (1999). Multimedia in three dimensions for archaeology, information retrieval with interactive models. Retrieved from <https://www.semanticscholar.org/author/Jeffrey-Jacobson/6400130?coAuthor%5B0%5D=Jane%20Vadnal&sort=influence>
- Koshy, V. (2010). *Action research for improving educational practice: a step-by-step guide*. London: Sage.

Legg, M.

McNiff, J. (2015). *Writing up your action research project*. London: Routledge

Nevin, S. (2015). Animations of Ancient Vase Scenes in the Classics Classroom. *Journal of Classics Teaching*, 16 (31), 32-37.

Newton, P. M. & Miah, M. (2017). Evidence-based higher education – is the learning styles myth important? *Frontiers in Psychology* 8:444. doi: 10.3389/fpsyg.2017.00444

Parton, A., Newton, D. & Newton, L. (2017). The implementation of object-centred learning through the visual arts: Engaging students in creative, problem-based learning. *International Journal of Education Through Art*, 13 (2), 147-162.
doi: 10.1386/eta.13.2.147_1

Thorpe, M. (1992). Historical technology. *Joint Association of Classical Teachers Review* 12, 2-5.