ENHANCING ADAPTABILITY IN GRADE 9 BOYS THROUGH TASK-BASED LEARNING

Nick Little

The Scots College, Sydney, Australia

Abstract

A Next Generation Learning Space (NGLS) is an exciting but foreign space for many teachers and students. While teaching in a NGLS, I witnessed some boys enjoy great learning success in the space, while others struggled. This action research project investigated whether a task-based learning (TBL) teaching strategy might help students adapt to a NGLS. TBL was adopted for a whole term of regular Science class and data were collected though a survey, photographs, exit tickets and focus groups. The data were categorised and coded and a simple thematic analysis performed. The findings show that TBL was successful in helping Grade 9 boys adapt to a NGLS. Boys expressed a positive feeling or "good vibe" about the space they were in, which lead to increased engagement. They recognized the difference the space made to their learning and they experienced independence during learning tasks. This research suggests that teachers using a NGLS could adopt TBL in an attempt to help students adapt to a new learning environment.

Glossary

Next Generation Learning Space (*NGLS):* a new type of classroom or learning environment fitted with non-classical classroom furniture.

Task-based learning (*TBL)*: a teaching technique where students choose their learning based on the set tasks and classroom activities designated by the teacher to meet the learning outcome.

Adaptability: "Appropriate cognitive, behavioural, and/or affective adjustment in the face of uncertainty and novelty" (Martin, Nijad, Colmar & Liem, 2013, pg. 1).

Physneyland: A nickname given to the next generation learning space. Used in some data collecting instruments.

Good vibe: A term used by a student to describe a positive emotional feeling.

Introduction

Background

Three years ago, a *Next Generation Learning Space* (NGLS) was installed in the secondary school Science building at The Scots College. Through its design, it attempted to disrupt classical teaching pedagogies and encourage an *activity-based learning* (ABL) approach amongst teaching staff. Due to time constraints and being unfamiliar with the space, staff and students found it hard to adapt teaching and learning strategies during the initial introduction. My first teaching experiences in the NGLS were frustrating for my students and me. Since that time there have been many attempts to achieve pedagogical success.

The Scot's College Science NGLS: Physneyland

One teacher recommended a change in approach that handed the students a greater responsibility for their learning. Tasks were set up that allowed the students greater freedom to use the space in the way it was intended. The transformation in our teaching was also marked by a change in attitude of the boys and how they learnt in the space. Teachers became more team-focused and the students made much greater progress in their ability to articulate their scientific understanding. Furthermore, they developed greater teamwork, independence, and enjoyment in their learning. These positive qualities in the boys' education inspired me to investigate further. Building on this foundation, my action research project employed a TBL intervention to help boys adapt to a NGLS.

Research Question

> *How might participation in task-based learning help Grade 9 boys adapt to a next generation learning space?*

Action Research Method

Action research relies on a "look, think, act" cycle of inquiry and action. It gives value to a small-scale classroom approach and does not rely on rigorous quantitative data analysis (Stringer, 2014). While adaptability traits have been measured quantitatively by Martin (2013), it is important to gauge whether students can articulate their own adaptability in a familiar classroom context. The localised nature of this project gives critical insight into behavioural, cognitive, and affective adjustment of boys in a NGLS. An advantage of an action research methodology is the opportunity for the researcher to change and adapt the process of the action if new information emerges during the project. Elements of TBL can be assessed and modified along the way if students and teachers can articulate a need. Furthermore, once a small-scale "look, think, act" cycle has occurred, a larger one can follow, so that the sphere of influence might be increased. Meaningful findings from the research can then be further investigated by schools and researchers as NGLS become more widespread.

Literature Review

It is critical to align action research with current literature if the proposed action is to be relevant and effective. This literature review discusses key concepts of the research question. Primary areas of interest include boys' learning, NGLS, adaptability, and TBL.

Next Generation Learning Space (NGLS)

Next Generation Learning Space is a term used to describe a new type of classroom or learning environment. These types of learning spaces have been implemented across Australia in primary, secondary, and tertiary educational institutions, including Churchie Grammar School in Brisbane and Newcastle University in NSW. Similar designs have also been used when creating spaces for the mainstream workforce. Companies such as Google and Commonwealth Bank of Australia have included elements of the NGLS in their office interiors. With the variety of terms, including "innovative learning environment," "hot desking," "future focused learning space," and "flexible work or learning," there is a need to define these types of work spaces. Fraser (2014) clusters these spaces under the term "Next Generation Learning Space" (NGLS) and has collated the key aspects. Primarily, these are spaces that:

- enable new pedagogies, including technology-enabled pedagogies, to be explored and trialled (Boys, 2011; Carr & Fraser, 2014);
- are intentionally designed to facilitate collaborative, connected, and active learning (Heppell et al., 2004; JISC, 2006);

- are technology-enabled and allow for students to use their own devices (Morrone & Workman, 2014);
- include formal and informal spaces, physical and electronic spaces (van Schaik, 2014);
- have comfortable furniture that is configured easily and quickly by academics and students to suit different pedagogies (Morrone & Workman, 2014).

Ling and Fraser (2014) make it clear that although there has been a significant amount of work on designing Next Generation Learning Spaces, little has been done to observe what effect they have on student learning and which pedagogies might work best in such spaces. Even less research has been developed in the use of NGLS in secondary schools and the impact they have on high school students' learning. This action research project is of significant importance to implement ideas from current research relevant to this area.

The design for these new spaces most often draws upon cognitive and social constructivist learning theories (Ling & Fraser, 2014). Intended pedagogies are primarily student-centred approaches that identify children as intrinsically motivated and able to construct their own understandings of the world around them. TBL is an attempt to address the need for a new pedagogy in the NGLS since previous experience demonstrates classical techniques can have limited success. Successful transition from classical learning spaces to NGLS appears to present students with challenges and requires teachers and students to adapt to best utilise the opportunities afforded by the space. The most successful learners will be the ones who most swiftly adapt to the NGLS (Keppell, 2014).

Adaptability to NGLS

For students to be successful in a NGLS, they must adapt primarily to the space and also to the teaching and learning styles that most appropriately accommodate the space. It is of critical importance to choose the most appropriate pedagogy to fit the space. As each space is different, it might be expected that a single pedagogy may not provide a solution for all spaces. Given the diverse range of these spaces and students' familiarity with classical style classrooms, it can be a demanding task to adapt to these new classrooms. Martin, Nijad, Colmar and Liem (2013) define adaptability "as appropriate cognitive, behavioural, and/or affective adjustment in the face of uncertainty and novelty" (p. 1). According to this definition, the NGLS is the uncertainty to which students must adjust.

A Boys' School Context

The key aspects relating to a NGLS that intersect with the distinct needs of boys include boys' natural physicality, their ability to adapt, and their diverse range of learning needs. Boys' natural physicality has been addressed by Lingard, Martino, and Mills (2009) through the implementation of an *activities-based program*. They found that increasing the amount of physical activity through the program successfully increased the engagement of boys in the classroom. TBL is flexible enough in nature to include aspects which account for the physical nature of boys. Amongst secondary school students, Martin et al. (2013) identified that low achieving males are the least likely to be able to adapt. This places great significance on the project theme of adaptability in the context of boys' schools. Given Martin's findings, it is likely that, in a class of 18 boys, there will be a number of boys who need assistance when adapting to the NGLS.

There is a range of pedagogical strategies which caters to the broader needs of boys in the classroom, including explicit teaching, hands-on activities, high structure, and success criteria (Lingard, Martino, & Mills, 2009). Owing to the range of abilities present in the class, a targeted approach to differentiation in the task design is essential. TBL presents an opportunity to plan a range of tasks, with both high and low degrees of support scaffolding, to allow accessibility to a broad range of student abilities. The strength of the proposed TBL action is that it can embed the specific needs of boys into the pedagogical approach, including their physicality, ability to adapt, and range of learning needs.

Task-Based Learning as an Action

TBL aims to bring together a range of content delivery methods (Zheng, 2014) where students choose their learning based on the set tasks, and classroom activities are designed by the teacher to meet the learning outcomes. TBL combines the following aspects into the instruction method:

- Considers the space in which the task is undertaken (Ling & Fraser, 2014)
- Allows a degree of freedom in choosing from a range of tasks to meet a student's ability (Basset, 2014)
- Connects tasks with the real world (Zheng, 2013; Basset, 2014)
- Embeds differentiation by the degree of scaffolding (Lingard, Martino, & Mills, 2009)

These key aspects of TBL draw together the specific needs of boys and take into account the NGLS. Due to this strong link, TBL is a natural choice of action to take for the project. It is

possible to embed tasks that cater for boys and their different academic abilities and the manipulation of specific tasks within TBL that can assist students adapt to the NGLS. Assigning appropriate tasks teaches boys how to use the space.

The literature review demonstrates the clear links between core aspects of the research question. These core aspects include boys' learning, NGLS, adaptability and TBL. A synthesis of the literature demonstrates that TBL has the capacity to help boys adapt to NGLS.

Research Context

The project was conducted at The Scots College, a high fee-paying independent boys' school in Sydney's Eastern Suburbs. It has a reformed Presbyterian heritage and draws on its Christian values to shape and inform practice in the school. Students are predominantly from a high socioeconomic background with many students coming from the Eastern Suburbs and North Shore of Sydney. There is also a strong representation of boarding students from rural Australia and overseas. The College has nine campuses and approximately 2,000 students.

The participants were 18, 14-15 year old boys from my Grade 9 Science class. The class met for nine, 50-minute classes a fortnight and the action occurred during Term 3, a 10 week-teaching term between July and September 2017. The class was selected because classes were scheduled in the NGLS.

Permission for students to participate in the project was obtained from students and parents by having them sign a consent form. Student names were omitted when reporting findings. Participation in the research project was entirely voluntary; students were informed they could withdraw from the study at any time.

The Action

Based on the summary of the literature, the action for the project was to introduce TBL as a teaching strategy to help students adapt to the NGLS. The expectation was, that by implementing a teaching technique to fit the space, students would respond positively and have more success in adapting to this exciting, unfamiliar, and new environment.

The boys received a digital content outline at the beginning of each week. Each task outlined desired objectives and described how these objectives were to be achieved by completing particular tasks. The task outline also specified where each task was to be completed. At the end of the week, students needed to demonstrate they had learned particular content points and they were able to check in with the teacher to reinforce their understanding. Tasks

involved individual learning, small group learning, and large group lectures. Other examples of tasks included:

- Making videos
- Group presentations
- Stileapp (computer-based activities)
- Mini lecture
- Whiteboard (chalk talk)
- Worksheets
- Teacher experiment demonstration
- Practical tasks
- Group research tasks
- Individual research task

In the design of each class task, it was important to seek guidance from the literature to create lessons that were informative and engaging, and that addressed the needs of the boys to adapt to the space. A collection of tasks aimed to consider the space, allow boys a degree of freedom with their learning, connect to the real world, and to cater for effective differentiation. Appendix B shows an example of a TBL week schedule that was distributed to students digitally.

Data Collection

It was integral to the scope of this project to collect qualitative and quantitative data as both data types provide different, yet equally important, information in addressing the overarching research question. Quantitative data were collected through the use of Google Survey Forms. This diagnostic tool was used to steer the direction of future data collection, analyse selected binary outcomes of the action, and to act as a summative tool for the final questionnaire. Qualitative data were collected by way of survey questionnaires, photographs, exit tickets, and focus groups. A strength of action research is its ability to collect and make visible a stakeholder's opinions, beliefs, views and assumptions (Stringer, 2014). To this end, questionnaires and focus groups in particular, provided information in the students' own language, giving the boys opportunities to describe their experience throughout the action.

Previous research (Martin, 2013) suggests that to focus on adaptability, the following domains should be considered: behaviour, affection and cognition. The table below shows the range of different data types adopted and the adaptability domain to which each one related.

Data Type	**Adaptability Domain**
Baseline Questionnaire	Generic
Exit ticket	Generic
Photographs	Behavioural and cognitive
Focus groups	Cognitive, behavioural, and affective
Final Questionnaire	Cognitive, behavioural, and affective

Based on the nature of adaptability, an adjustment to the NGLS would occur over a period of time after the initial introduction. It was therefore important to include multiple data sources collected at various points in time. This also gave an opportunity to polyangulate points of interest in the data to increase the credibility of the information gathered (Stringer, 2014). Previous research suggests that 15-year-old low-achieving males find it hardest to adapt, hence it was necessary to give boys multiple opportunities to demonstrate their ability to adapt over the three different categories (Martin, 2013) and to collect data around each of these opportunities.

The Analysis

Once data were collected, they were subsequently analysed and coded. Within the analysis it was important to gauge similarities and differences, with the aim of discovering new phenomena relating to the use of task-based learning (TBL) (Stauss & Corbin, 1990). Data were further analysed to ascertain whether there were indications of adjustment in the categories of behaviour, affection, and cognition. As boys responded to surveys, they were interviewed throughout the action period. Through my analysis of the data, clear themes emerged which helped capture the essence of the boys' experiences.

Discussion of Results

Through data analysis, I identified four major recurring themes: positive feeling or *good vibe*; spatial impact; increased engagement; and independence.

Positive Feeling or *Good Vibe*

Overall, it was clear that boys could articulate their positive feeling towards the space, defined in the data as increased freedom and happiness. As the action period progressed, one boy described the experience as "a bit more free in here," and another student remarked, "It's kind of a happier place.... You get a *better vibe* from this classroom compared to others." These statements demonstrate how students attributed a positive feeling to the space. Students also articulated their positive feelings compared with other classrooms. Classical classroom design tends not consider the students' enjoyment. However, based on the student-centred pedagogies which underpin much of the design philosophy of the NGLS, students recognised that their interest and feelings have been considered in the design of the space.

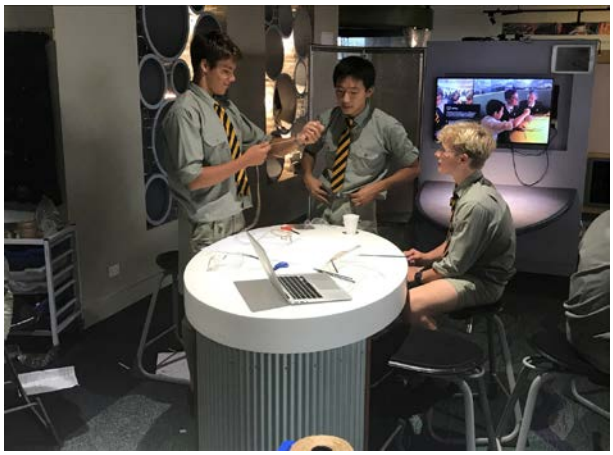
Spatial Impact

The boys had no difficulty identifying the types of tasks they felt had the greatest benefit for them and how the space impacted their learning in relation to these tasks. When asked what the best types of learning tasks were, one boy replied, "group tasks, because there are so many places where there is a round table where you can communicate with each other," and another boy stated, "it has the capability to hold large groups, but if you also want to work by yourself there are various areas you can do that." Students had an awareness that the tasks were being matched to the space, as exemplified when one student responded, "The classroom is fit for the tasks we do." The boys could clearly link their learning to the types of tasks they did in the space.

Increased Engagement

A vivid response from the boys about how they felt as they were learning in the space was observed. Increased engagement was defined in the data by increased productivity, increased interaction and understanding, as well as sustained focus and attention. One boy said, "Being in here you can engage a lot more thoroughly with the task," and another observed, "I interact with lessons better in this space ... even if I was doing the same task it would just be easier to understand." Compared to other learning experiences, the boys were able to identify that TBL in the NGLS engaged them more thoroughly in their learning. One boy described that "being in a conventional classroom with whiteboards and desks, it's boring you know, and you tend to

get distracted." Many students shared an experience where TBL in the NGLS allowed them to thrive in their learning by providing them with greater engagement.

Students gathered around the white benches engage with a design and practical task.

Independence

Many students struggled with the level of independence associated with the NGLS. While some students thrived on the freedom and the access to new space, others found it difficult to adapt their behaviour to the NGLS. Most boys were able to articulate that they needed to make a conscious decision to avoid distractions; one boy stated, "I reckon it's kind of hard, you get more distracted in here." Other students made a conscious decision to take responsibility for their actions in the NGLS. This attitude was perceptively observed by one boy "in here it allows you to participate or act however you want, which makes it more enjoyable to act better." The TBL program unlocked this boy's ability to enjoy behaving in a more responsible way and his increased independence brought about by TBL allowed him to flourish. Some students clearly identified the greater degree of independence throughout the TBL in the NGLS as exemplified by statements such as, "In this classroom you have to work way more independently," and "In this area I notice you get a lot more independence which is really important." In many instances they described independence in their learning and their class time in a positive way. Other students, however, had an opposite view, stating, "You could say that some people use it as an excuse to act silly, but that's their fault, they're just wasting the space," and "There's lots of open spaces so you can hear everything." While some boys found it challenging, many boys found the greater independence an important component of their learning. In summary, student engagement and independence were closely linked. As students mastered independent

learning, their engagement increased, and as engagement increased, students were more independent in the space.

Final Survey

The final survey was critical in identifying the key aspects of TBL that were effective. The teaching strategy relied heavily on students becoming better at a particular range of learning tasks that are uncommon in a conventional classroom. The majority of students polled said the following tasks were most beneficial for NGLS: making videos, group presentations, group tasks, practical tasks, and teacher demonstrations. Contrastingly, the boys identified the least helpful activities in the NGLS as individual tasks, use of the whiteboard, and worksheets (Fig. 1). Further responses from the final survey indicate that the majority of students changed their behaviour, affection and cognition in the NGLS (see Appendix A), which, according to Martin (2013), shows successful adaptation. The majority of boys said they made changes in order to work better in the space (Fig. 2) and when asked whether they had adapted to the NGLS, all but one responded affirmatively (Fig. 3).

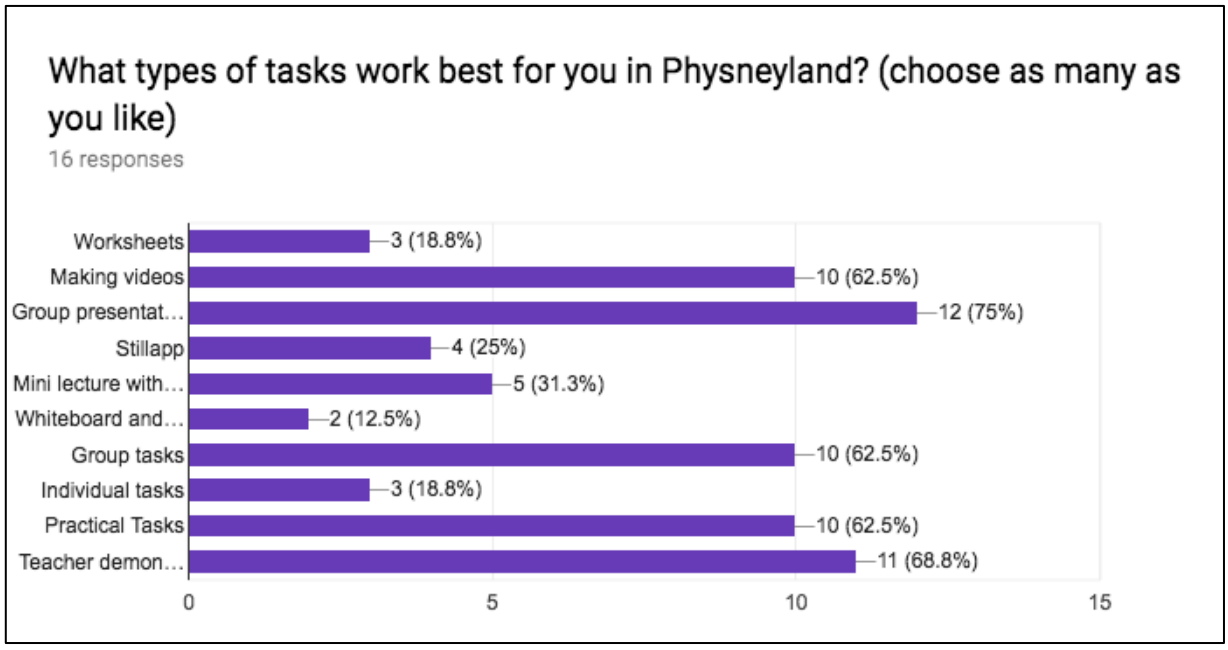


Figure 1: Rating of tasks in Physneyland

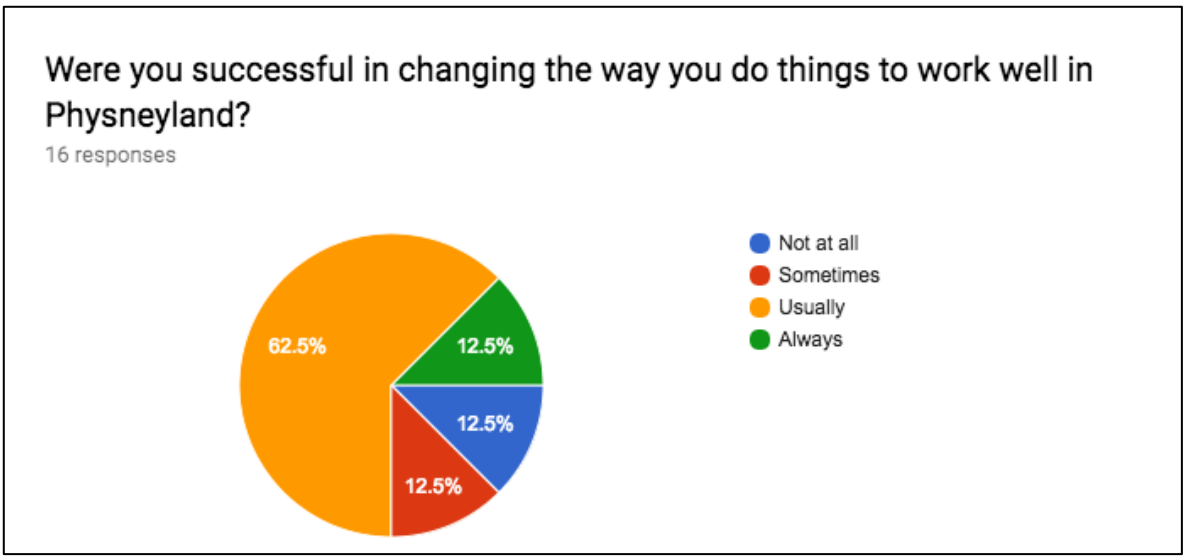


Figure 2. Adapting to work in Physneyland

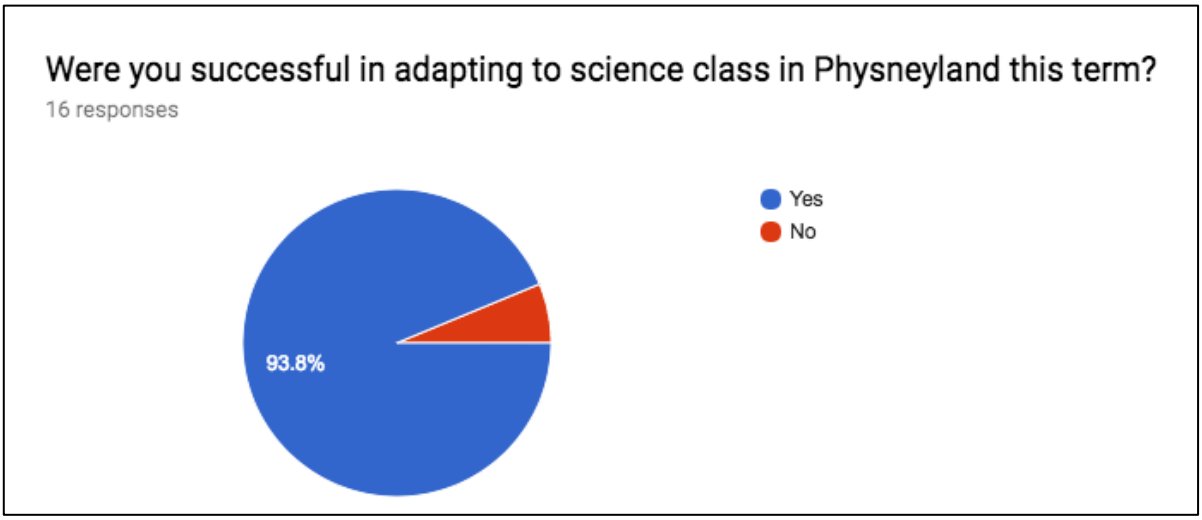


Figure 3. Success in Physneyland

Intersections with Adaptability

Further analysis of the qualitative categories was undertaken to gauge if they naturally fitted into any of the three adaptability domains of behaviour, affection, or cognition (Martin, 2013). Upon inspection it could be clearly seen that they indeed did. "Positive feeling or *good vibe*" fits the affective domain because of the nature of the language the boys used to describe an emotional response to the NGLS. "Recognise the impact of the space on learning" and "greater engagement with learning" fit into the cognitive domain, as these two categories are distilled from the boys talking about how their thinking changed as the period of the action continued. Finally, "independence" fits into the behavioural domain because the data collected in this

category describes how students changed their behaviour in ways that impacted their independence across a broad range of activities. This neat intersection provides further support to suggest that the students successfully adapted to the space.

Conclusion

The success of this action research project is clear, and the research question was answered by the four categories which emerged from an analysis of the data. Task-based learning helped boys adapt to a NGLS by fostering a positive affection for the space, enhancing independence in their learning, giving boys an awareness of the space they were in, and increasing their engagement in learning. Not only did the boys adapt but they excelled beyond the expectations of a classical classroom as a result of TBL in NGLS.

There are some limitations to consider, including:

- The ability to collect data at regular intervals over the sustained period of action was a challenge. I often needed a colleague to cover a class in order to take photographs or to conduct focus group interviews.
- The Scots College NGLS is unique; another NGLS may be quite different.
- For some students it was not their first time in the NGLS, so their adaptation to the space may have differed from a boy who was brand new to the space.
- This action research project only used one class as the research sample, out of two that were experiencing team teaching. This may have had an impact on the data collected.
- Many data were collected through student self-assessment. Future studies should consider data from sources outside student assessment to polyangulate data further and to increase the validity of the research.

Given these limitations, the validity of the action research process is maintained by the clear response of the boys in how they articulated their responses in the data and by following the action research method.

It is evident that more research in the area of NGLS and matching pedagogy must continue throughout secondary schools. Secondary school cultures often have a high focus on student outcomes, most directly met by quality of learning that occurs in the classroom. It is important to find the teaching and learning techniques that work best for boys if these spaces are to be utilised to their potential. TBL is one technique among many that is likely to be successful in a NGLS; however, finding which techniques work best for each space may take the community of teachers much time and effort. The definition of TBL remains malleable enough to review

and adapt for use in many types of NGLS. It is for this reason that it was used in this project and can it hopefully can be translated into other classrooms with ease.

Implications for Future Practice and Research

There are several areas worth pursuing further in research as well as best practice recommendations. As mentioned in the literature review, NGLS are continually being built in schools, universities and workplaces. It appears that there is a significant literature gap in evidence-based best practice use of a NGLS in secondary schools, particularly in the Science curriculum. As there has been a sustained impetus in the STEM curriculum areas, more NGLS have been commissioned in an attempt to promote innovation in teaching and learning. It is therefore important to develop emerging leaders of best practice pedagogy in NGLS. A paradigm shift in planning and execution of lessons is required to be successful. Regular training and resources are required to assist teachers in the adoption of a NGLS.

For schools embarking on the brave move toward NGLS, the following recommendations will ensure that both staff and students experience a positive transition to the new environment:

- Professional development for staff regarding the best teaching techniques for NGLS.
- Student introduction activities in the NGLS.
- Team teaching partners for staff to provide small-scale mutual support.
- Timetable and administration requirements optimised for the use of space (e.g. same two classes timetabled at the same time rather than rotating in and out throughout the timetable cycle to build team teaching momentum).
- A collaborative, growth mindset and a team-focused school culture that supports teachers when they trial new teaching techniques.

Ensuring enhanced student accountability of learning is important. With a student's ability to move around the space more independently, there is a chance some students may use this independence to be less productive in their learning than usual. A teacher should establish classroom systems to maintain and enhance student accountability and evidence of their learning.

Throughout the action period, there was an opportunity to team teach with a colleague. Opportunity is perhaps the wrong word to use here, as team teaching became *necessary*, or else the teaching program would have suffered greatly. Much of the success of the project was due to a collaborative approach. There are many examples in literature of the benefits of team

teaching. It is worth conducting further study to investigate the benefits of team teaching in NGLS.

Owing to this collaborative teaching approach, the teaching team needs time to plan together. Usually teachers met weekly to plan the next week's lessons and to allocate space and resources. To be successful, this planning had to draw on the ideas of TBL and this also required careful thought about what tasks were appropriate. A further recommendation for staff teaching in NGLS is providing extra time to meet, plan, and adapt current curriculum.

Reflection

This action research project has given me a greater passion for boys' education and in finding solutions to complex problems in teaching. I wish to pursue further study in the area of NGLS. Since the project launch last August, more research has emerged on the topic and research groups are publishing more of their findings about evidence-based best-practice pedagogy. This is energising for me to see others engaged in similar research. The international aspect of the project also made the experience richer for me. I have enjoyed connecting with educators who share the passion for boys' education around the world.

References

Boys, J. (2011). *Towards creative learning spaces: Re-thinking the architecture of post-compulsory education*. Abindon, Oxon; New York: Routledge.

Bassett, M. M. (2014). Self-directed activity-based learning and achievement in high school chemistry. *Education Research and Perspectives, 41*, 73-94.

Carr, N., & Fraser, K. (2014). Factors that shape pedagogical practices in next generation learning spaces. In K. Fraser (Ed.), *The Future of learning and teaching in next generation learning spaces*, 12. International Perspectives on Higher Education Research. Bingley, UK: Emerald

Fraser, K. (2014). The future of teaching and learning in new generation learning spaces. In K. Fraser, *The Future of Teaching and Learning in New Generation Learning Spaces, 12,* xv-xxiv. International Perspectives on Higher Education Research. Bingley, UK: Emerald

Heppell, S., Chapman, C., Millwood, R., Constable, M., & Furness, J. (2004). Building learning futures. *The Building Futures programme*. UK: *CABE/RIBA.* Retrieved from http://pasaporte.urosario.edu.co/urosario_files/3a/3ab3bd4d-2bf4-4e5a-94c9-2b6da193db8f.pdf

JISC. (2006). *Designing spaces for effective learning.* London: JISC. Retrieved from http://www.jisc.ac.uk/whatwedo/programmes/elearninginnovation/learningspaces.aspx

Keppell, M. (2014). Personalised learning strategies for higher education. In K. Fraser, *The Future of Learning and Teaching in Next Generation Learning Spaces*, 12, 3-21. International Perspectives on Higher Education Research. Bingley, UK: Emerald Group Publishing Limited

Ling, P., & Fraser, K. (2014). Pedagogies for next generation learning spaces: Theory, context, action. *The Future of Learning and Teaching in Next Generation Learning Spaces,* 65-84. International Perspectives on Higher Education Research Bingley, UK: Emerald Group Publishing Limited

Martin, A. J., Nejad, H. G., Colmar, S., & Liem, G. A. (2013). Adaptability: How students' responses to uncertainty and novelty predict their academic and non-academic outcomes. *Journal of Educational Psychology, 105*(3), 728-746.

Martin, A. J., Nejad, H., Colmar, S., & Liem, G. A. (2014). From measurement to modelling: A case study of the development and implementation of the adaptability scale. *Sage Research Method Cases*, 1-17.

Morrone, A., & Workman, S. (2014). Keeping in pace with the rapid evolution of learning spaces. In K. Fraser (Ed.), *The future of learning and teaching in next generation learning spaces*, 12. International Perspectives on Higher Education Research Bingley, UK: Emerald Group Publishing Limited

Savery, J. R. (2015). Overview of problem-based learning: Definitions and distinctions. In J. R. Savery, & H. L.-S. Andrew Walker (Ed.), *Essential Readings in Problem-Based Learning*, 5-15. West Lafayette: Purdue University Press.

Stringer, E. (2014). *Action research*, 4th Edition. USA: Sage Publications.

Strauss, A., & Corbin, J. (1990) *Basics of qualitative research: Grounded theory procedures and techniques*. USA: Sage Publications.

Van Schaik, L. (2014). Developing the briefing for the designing of the learning landscape: Reflections on RMIT (Royal Melbourne Institute of Technology) University of Technology and Design's approach to next generation learning spaces. In K. Fraser (Ed.), T*he future of learning and teaching in next generation learning spaces (International Perspectives on Higher Education Research), 12*. Bingley, UK: Emerald.

Zheng, X., & Borg, S. (2014). Task-based learning and teaching in china: Secondary school teachers' beliefs and practices. *Language Teaching Research, 18*(2), 205-221.

Appendix A

Figure 4: Cognitive Adjustment Survey

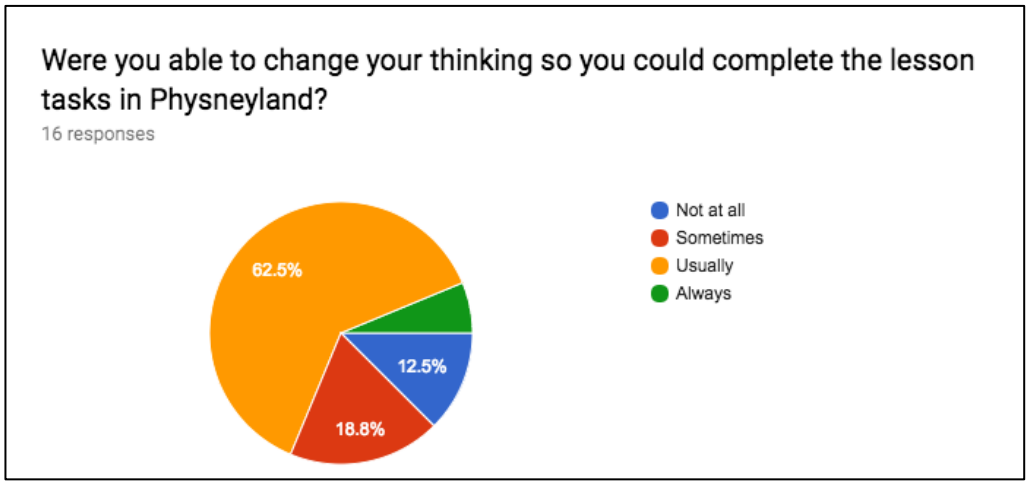


Figure 5: Affection Adjustment Survey

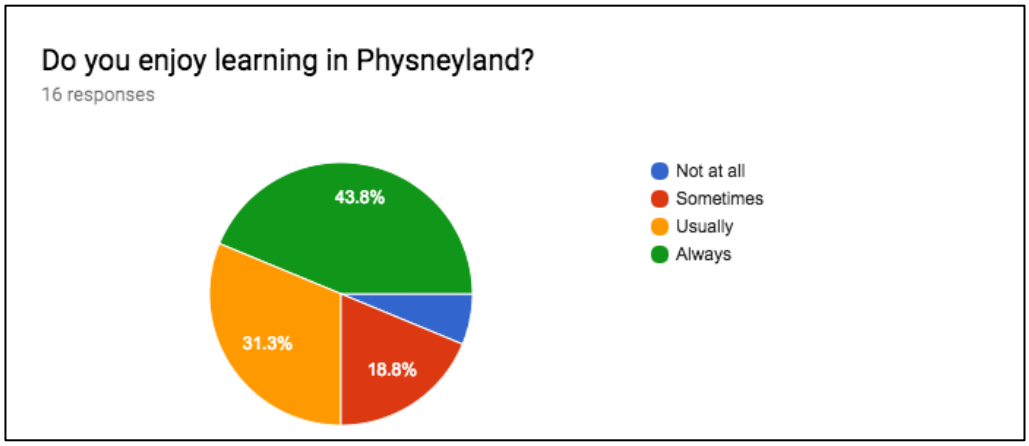
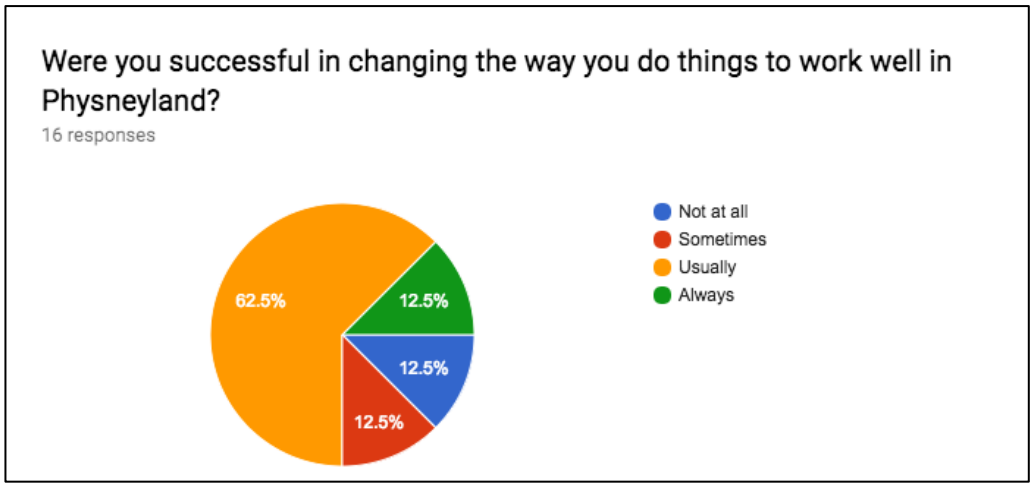


Figure 6: Behaviour Adjustment Survey



Appendix B

Year 9 Atom and Periodic Table lessons:

These Activities need to be completed by the end of Wednesday's lesson.

Work in the areas assigned to each task.

Task A: Plasticine model of an atom: (White benches in groups of 2)

1. Choose an atom from Hydrogen to Carbon.
2. Make a model to show the number of protons, electrons, neutrons and their position in the atom.
3. Label each using masking tape and toothpicks
4. Take a picture for your records.

Task B: Periodic Table Labels (wave bench)

Using the Periodic Table sheets make a key and colour the following:

Metals, non-metals, semi-metals.

Stick this into your science book.

Task C: Lecture (spaceship)

Go and listen to Mr Little tell you about how to read the periodic table.

Make notes here:

1. What are groups?
2. What are periods?
3. What is the atomic number?
4. What is atomic mass?
5. How do you work out protons? Neutrons? Electrons?

Task D: Youtube video (green room with headphones)

https://www.youtube.com/watch?v=thnDxFdkzZ

Watch the video on the atom and answer the questions:

Write your answers in your science book.

1. Describe the plum pudding model of the atom from the video?
2. What did Rutherford discover about the atom?
3. What is the nucleus?

Task E: DEMO (White Bench)

Watch the demonstration from the teacher and answer the questions

1. What is the trend of reactivity as the period increases?
2. What is the trend of reactivity as the group increases?
3. What do you think would be the most reactive element on the periodic table?

Task F: Jacplus 5.1

Read chapter 5.1 in Jacplus and answer the Questions 1-10 in your Science book.