# FOSTERING CURIOSITY IN GRADE 5 BOYS THROUGH INQUIRY-BASED LEARNING

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**Abstract**

The purpose of this study was to investigate whether inquiry-based learning fostered curiosity in Grade 5 boys. For this action research project, 29 boys were exposed to a six-week inquiry unit which was guided by the essential question, *Can rooftop gardens help feed our cities' homeless?* Their inquiry involved research into the historical and political background of our city as well as biological and sustainable aspects of gardening.

Throughout the six weeks, I made careful observations and notes on the behaviours witnessed in the boys. I also collected regular data from them to assess whether the change in instructional practice did indeed foster curiosity.

The results of this project highlight that a change in instructional practice can assist in the development of 21st century dispositions, specifically curiosity, as probed in this study. This action research project and its results have had a profound impact on my practice and development. Two immediate outcomes derived from this study have been whole staff IBL training as well as the planning of units in Grades 4 and 5. These units will include a transdisciplinary approach in its planning and implementation.

## Introduction

Globalisation and rapid automation present students with the challenge of considering careers and professional paths that may not yet exist. This uncertainty requires a focus on a broad range of 21st century competencies and skills. Adaptability is one such focus. Andrew Martin defines adaptability as "the capacity to respond to uncertainty, change, and novelty" (2013, para. 4). For our boys to thrive and succeed in future industries, it is necessary that our pedagogies meet these shifting demands.

Through the process of inquiry-based learning (IBL), I hoped to assist a group of Grade 5 boys develop curiosity and a sense of agency in their own learning. People who are curious orient their lives around an appreciation of novelty and a strong urge to explore, discover,

and grow. They exhibit adaptive behaviours including tolerance of anxiety and uncertainty, positive emotional expressiveness, initiation of humour and playfulness, unconventional thinking, and a non-defensive, non-critical attitude (Kashdan, Sherman, Yarbro, & Funder, 2013).

St Stithians Boys' Preparatory is a traditional school with an extensive curriculum. Our boys are provided with many opportunities to develop their minds, souls and bodies through rigorous academic, sporting, and cultural programmes. My goal and desire was for my boys to engage in authentic, inquiry-based learning that would aid in developing their own agency and intellectual curiosity. In doing so, I hoped to witness the locus of control of learning shift more from the teacher to the student. Based on these objectives, I developed the following research question: *How might inquiry-based learning (IBL) foster curiosity in Grade 5 boys?*

Through the process of action research, I endeavored to improve my own pedagogy and instruction to cater to the future needs of my boys. Stringer (2014) defines action research as "a systematic approach to investigation that enables people to find effective solutions to problems they confront in their everyday lives" (p. 1). This qualitative research approach afforded me the opportunity to find a solution to what I perceived to be an area in need of improvement in our context, thereby enhancing my own effectiveness.

## Literature Review

The ubiquitous influence of technology has transformed every sector and industry the world over, including education. As the digital economy transforms the workplace, skills such as collaboration, communication, creativity, and critical thinking will become ever more important as more traditional roles are mechanised. Dr. Shimi Kang (2015), in her book *The Dolphin Parent*, cites these as necessary twenty-first century skills if our children are "to do well in today's fast-paced, highly social, ultra-competitive and globally connected world" (p. 171). Schools, therefore, increasingly need to prepare students for a future that is yet to be conceived and careers that are yet to be invented. Adaptability thus becomes a core skill for boys in our schools.

Inquiry-based learning (IBL) is a valuable instructional approach that aids in the development of the all-important twenty-first century skills. Alberta Learning (2004), in their publication, *Focus on Inquiry*, defines inquiry-based learning as:

> A process where students are involved in their learning, create essential questions, investigate widely and then build new understandings, meanings, and knowledge. That knowledge is new to the students and may be used to answer their essential question, to develop a solution or to support a position or point of view. The knowledge is usually presented to others in some sort of a public manner and may result in some sort of action. (p. 11).

In his book, *Dive Into Inquiry: Amplify Learning and Student Voice,* MacKenzie (2016) notes, "the benefit of increased student agency over learning, the authentic connections we make to the world around us, and the twenty-first-century skills inquiry-based learning (IBL) nurtures provide great reason to explore how inquiry can enhance what you are doing in your own classroom" (p. 64). By having a group of Grade 5 boys participate in a unit of work which was scaffolded and authentic, I hoped to witness the locus of control of learning gently shift from me, as the teacher, to them as individuals and as collaborative groups.

A change in teaching approach fundamentally required a change in the way I viewed my role in the classroom. MacKenzie (2016) notes, "a strong inquiry classroom requires I take on many different roles — teacher, coach, facilitator, networker, shoulder-to-lean-on — at different times and for different reasons" (p. 55). This fluidity required a thorough redefining of my role in the classroom. In addition, I hoped to witness whether inquiry-based learning would foster curiosity in my participants. The psychological urge evoked by curiosity is accompanied by increased engagement with the world including exploratory behaviour, meaning-making, and learning (Hill & McGinnis, 2007). These elements are all part of a strong inquiry classroom, one in which boys are encouraged to explore and question beyond the boundaries of the curriculum.

According to a study by Kashdan, Sherman, Yarbro and Funder (2013), curiosity can be both top-down and bottom-up. Bottom-up curiosity involves a sense of wonder and desire to explore in response to a novelty, complexity, and an unexpected event. Top-down curiosity, on the other hand, involves the intentional search for novelty and challenging stimuli. This

self-initiated search for novelty goes beyond the obvious and mundane and seeks to ask questions that may not have an answer in themselves but pose different possibilities. This type of curiosity is less about the outcome and more about the engagement itself.

The study by Kashdan et al. (2013) found that curiosity was linked to a wide range of adaptive behaviours including tolerance of anxiety and uncertainty, positive emotional expressiveness, initiation of humour and playfulness, unconventional thinking, and a non-defensive, non-critical attitude. I evaluated my participants' behaviour against this list of behaviours to establish whether inquiry-based learning assisted in fostering curiosity.

In their book *Reaching Boys, Teaching Boys: Strategies That Work and Why*, Michael Reichert and Richard Hawley (2010) note:

> A prominent and recurring feature of many of the lessons reported as especially effective were those in which problems with indeterminate outcomes were posed. The goal was not for the boys to discover or compute a right answer, but to formulate a solution according to their own research and best lights. (p. 107)

This passage does well to explain why IBL is potentially relevant and well suited to boys. Boys love to discover and tinker for themselves, thus encouraging bottom-up curiosity and authentic learning. Furthermore, Reichert and Hawley (2010) share boys' accounts that affirm and encourage the importance of giving boys the opportunity, time, and room to carry out an assignment or solve a problem on their own. The boys in their study went on to note a boost in confidence and pride in their own accomplishments.

Through this project, I hoped to enhance my own effectiveness as a teacher and assist in preparing my boys for a future they are yet to inhabit. This action was not just a one-off process, but rather an added tool in my kit to aid in the development of our boys. By focusing on the development of twenty-first century skills, I intended to help my boys succeed and thrive in the digital economies of the future.

## Research Context

St Stithians Boys' Preparatory is one of five schools that make up St Stithians College. A preparatory school with an enrollment of 400, we educate boys between the ages of eight and thirteen years old. Our College is situated in Sandton, South Africa, a region which is

considered the business hub of Africa. As a proud Methodist Church school, we hold dear to our Christian roots, yet seek to reflect a society that is diverse and multifaceted. Our school tagline is *Inspiring Excellence, Making a World of Difference*. This ambition is given expression in each of our pillars: academics, sport, culture and leadership as well as in our community engagement activities. As *Saints,* we seek to espouse our values of responsibility, courage, love, honesty, and faith.

The participants in my study were 29 Grade 5 boys. I taught this group for a total of 90 minutes per week in their Natural Science class. Since embarking on the study, the boys were eager to discuss the research and their involvement in it.

Consent was obtained from each participant as well as their parents. Letters were sent home informing families of the research. Boys had the opportunity to ask as many questions as needed before signing the consent. They were also able to withdraw at any time during the process. All data collected were anonymous, thereby protecting the identities of the participants and ensuring anonymity.

## The Action

Before we commenced our unit of study, I took my participants to the inner city of Johannesburg. This experience was a first for many of the boys. The inner city is a shadow of its former glory. Its decay is due, in part, to the relocation of large corporates and retailers to the north of the city. Its crumbling infrastructure has not been maintained in many years and its residential buildings have become home to illegal immigrants and vagrants. Thankfully, there is much political and business growth to fast track the city rejuvenation plan. This was the context of our visit. The boys were encouraged to take as many photos as possible as they each needed to write a reflection on their experience. Following this, we delved into a micro-study of our city's political and social history.

With this understanding, we went through the process of developing an essential question. This question drove our inquiry into the study of plants as well as rooftop or urban gardening. At this point, no longer was I providing direct instruction to my boys. They had the necessary tools and scaffolding to direct their own learning. Throughout the 6-week period, the boys worked at different paces and provided evidence of learning in different forms.

Based on their study into the diversity of plants, plant reproduction, and urban farming, the boys had to submit an electronic book which captured their learning and final answer to the essential question. In addition, they had to establish a small-scale rooftop garden at school.

**Data Collection**

My action research project was primarily qualitative in nature. Because it was designed around the experiences and perspectives of my participants, the voices of the boys were crucial to the data collection process. According to Stringer (2014), our role as researchers is to understand participant experiences in order to work toward a viable solution in which people will invest their time and energies.

My data gathering process started with a pre-action survey that was designed and distributed as a Google Form. The boys also completed the survey at the end of the action. The aim of the survey was to establish how the boys perceived their intellectual curiosity and agency pre- and post-IBL unit.

Participant observation was also a necessary and pivotal data collection method in my research. Notes, photographs and videos allowed me to observe visible changes in the boys' behaviour. I used the adaptive behaviours listed below as a check to guide my observations:

- Boys moving from being passive recipients to being much more active in the learning process and actively involved in the decisions about the learning.
- The locus of control of learning gently shifting from the teacher to the student
- Boys asking quality questions
- Increased participation in group and peer learning
- A sense of discovery, engagement, and achievement
- Boys increasingly becoming self-directed
- Positive emotional expressiveness
- Tolerance of anxiety and uncertainty
- Unconventional thinking
- A non-defensive, non-critical attitude

- Initiation of humour and playfulness

The boys completed exit tickets regularly. The aim of the tickets was twofold. Firstly, they were used to ascertain whether students understood the content and ideas they inquired into for the day. Due to it being a structured inquiry task, I required all groups to fulfill the same learning objectives. Secondly, the ticket sought to establish whether the boys adapted to the newly introduced pedagogy.

The final data collection method was a focus group discussion consisting of 5 boys. This small group discussion allowed the boys to reflect with greater clarity on their experience and provide more insight into the survey responses. This group was small enough to allow each boy an opportunity to share his personal experience and perception.

## Analysis

The data collected were analysed using a thematic analysis approach. I followed the steps outlined in Stringer's (2014) work: categorise and code, identify themes, organise a category system, and develop a report framework. Whilst this type of analysis can be difficult because of the many scotomas of the researcher, it is a source of rich textual feedback that values the voices of the participants and their lived perceptions and experiences.

## Discussion of Results

In introducing inquiry-based learning to my Grade 5 boys, it was important that they had a thorough understanding of the learning objectives as well as the assessment which would form part of the unit of study. This project not only required the boys to engage in the science of the task, but also introduced them to the social and historical background of the city. Once this was done they could delve into the unit and consider the essential question: *can rooftop gardens help feed our cities' homeless?* The data gathered during this action research task were distilled into 4 main themes: destination without maps, engagement through design and creation, energized by collaboration, and contextual learning.

### Destination Without Maps

I love the phrase, academic elbow room, as cited in the work of Reichert and Hawley (2010). This sense of independence and autonomy comes with a measure of uncertainty and risk, yet it provides boys with a rewarding opportunity to take a leading role in their education

and in so doing, nurture their intrinsic motivation. It is important to note that although this unit was a structured inquiry task with the necessary scaffolding in place, the boys could exercise their choice within the perimeters of the task.

At the start of the unit of study, 17 of the 29 boys felt they were curious individuals and 13 of the 29 boys felt they needed the teacher to take them step-by-step through the learning process. As they engaged with their essential question through study and by creating a rooftop garden, the boys appeared to be more energized by the sense of autonomy and authentic learning. They were acutely aware of the output that was required, yet they could decide on the appropriate means to get themselves there.

By the end of the unit, 25 of the 29 boys felt they were curious individuals and 6 of the 29 boys felt they needed constant teacher input. These results indicate that even though it was difficult and hard at times, the boys achieved a sense of discovery and achievement. I witnessed many of the boys move from passive students to being engaged and in control of their own learning. The boys became more and more comfortable with uncertainty and the need to adapt to the learning requirements. Over time, I observed the locus of control of learning progressively shift from me to my students.

Every lesson presented new learning opportunities and the afforded academic elbow room allowed boys to choose their preferred path. Initially, this was unsettling for many boys, because it was a foreign experience and for some it even caused a sense of anxiety; however, the boys soon adapted to the new learning strategy and exhibited joy and humour in the process. It was refreshing to observe the curiosity and energy with which they delved into their research question.

In the context of South Africa's increasing unemployment and poverty, the boys found the essential question challenging yet stimulating. After a visit to the inner city of Johannesburg, one of the boys pointed out, "I was very nervous coming to the inner city, but this experience was amazing."

**Engagement Through Design and Creation**

In their book, *Reaching Boys Teaching Boys: Strategies That Work and Why*, Reichert and Hawley (2010) reported, "The boys' reports of their favored lessons strongly corroborated

the special engagement and empowerment their teachers observed in the process of being required to make things" (pg. 31).

A strong theme in the accounts of the boys was the energizing effect and sheer engagement they derived from the production process. Boys attributed this to being able to design and build hydroponic or traditional garden apparatus for our rooftop garden. After questioning boys about giving up their precious break times to work on their projects, one of the boys responded, "This doesn't feel like work." Not only did he feel a sense of purpose in the learning task, his research and garden would assist in answering a question asked by farmers, city planners, and engineers alike. In direct proportion, this sense of purpose was the boys' achievement. Their curiosity and engagement resulted in a marked improvement for 10 of the boys between Terms 2 and 3. As mentioned by the internationally recognised leader in the development of creativity and innovation in education and business, Sir Ken Robinson (2009), "Curiosity is the engine of achievement."

Two boys felt they could have learnt more by direct instruction rather than engaging in the inquiry process. Upon reflection, I realise that some students enjoy the order and security of printed content. This will be built into my scaffolding strategy for future units.

**Energizing Collaboration**

Close observation of the boys' interactions revealed healthy engagement when learning outcomes and timeframes were clearly understood. It was also important that boys all "share the air" and actively participate in their groups. As cited by Reichert and Hawley, "The very process of collaboration seemed to drive the intended learning outcomes forward" (2010, pg.122). Twenty-four of the 29 boys expressed an enjoyment of the collaborative nature of the task. There was a sense of healthy competition between groups to produce a well-rounded research report and garden, yet an appreciation of cooperation also existed between the members of each group. At the start of every lesson, groups were afforded an opportunity to reflect on their progress and each person's contribution. In some instances, projects flourished, and others perished; this all became a point of discussion and reflection. It was critical that the boys understood that the assessment would focus on their learning, involvement, research, and report, and less on the project at the end.

By their very nature, collaborative learning groups require members to be adaptive and tolerant. The boys needed to agree on common language to express appreciation and approval, as well as disappointment and disagreement, without becoming defensive and critical. One of the participants reflected on his strong dislike for group work; however, he added, "this felt easier because this was not just about marks, it was about learning and working together." This was a personal light bulb moment for me – it was about learning groups not just group work.

In addition, it was also very important that the boys channeled their curiosity in a way that was of benefit to the group. This took careful discussion and negotiation as each of the boys brought their own interest, experience, and prior knowledge to the table. Whilst this was a challenge at times, shared interests, experiences, and questions often fueled the curiosity of the group and provided boys with needed momentum.

**Contextual Learning**

At the commencement of the unit, many of the boys felt overwhelmed by the task and learning objectives; however, once they had an opportunity to visit the inner city, I observed a greater confidence due to their contextual understanding. The boys took photographs of the inner-city buildings and could see first-hand the number of homeless people needing assistance.

Not only did this spark an intellectual curiosity to complete their research task, it also alerted the boys to their moral obligation to assist fellow citizens. From their position of privilege, they could participate in creating solutions that could alleviate poverty in our city. Many of the boys recognised this as an important part of the learning in this unit. One of the boys mentioned that he "wished all subjects involved real world problem solving."

Twenty-seven out of the 29 boys cited our visit to the inner city as a big influence on their commitment to the unit. They had a more concrete understanding of the challenges and social background of the city and what is required to improve conditions and help our homeless citizens.

## Conclusion

My sense before embarking on this research project was that my boys would enjoy the autonomy and choice they would experience in this project; however, the extent of their response was overwhelming for me. Many boys willingly sacrificed their playtime to tend to their gardens. I would receive copious private messages from boys in Google Classroom throughout the duration of the 6 weeks informing me of an interesting fact or simply asking questions. There was less "off-task" behaviour in the classroom and boys spoke freely of their research and discoveries.

Through my data analysis, I learnt that inquiry-based learning is a powerful instructional practice to foster curiosity. Boys thoroughly enjoyed the choice and transfer of knowledge this unit presented. They had to use the knowledge they acquired to create a sustainable garden as well as answer the essential question.

Inquiry-based learning and its planning framework have become part of my thinking and lexicon. I will be introducing my Grade 7 Science class to an inquiry unit next term and have introduced the planning framework of Wiggins and McTighe (2005) to our entire staff. In addition, I will be supporting my Grades 4 and 5 colleagues in their first IBL units in term 2.

Unless we actively promote, measure, and reflect on future-fit competencies, our students will not naturally develop them. It is incumbent on us as teachers and parents to prepare our boys for a rapidly changing digital world, one that requires a skill set that is digital, human, and transferable.

## Reflection

This action research project was both challenging and fulfilling. Firstly, by engaging with the literature, I came across a planning framework that revolutionised my planning and conceptual understanding of inquiry-based learning. I have spoken of the importance of 21st century competencies for a long time, but this project gave me the opportunity to truly engage and measure these competencies in my classroom.

Action research is a simple yet profound strategy to target improvement that is underpinned in research. Engaging in this project gave me the tools and confidence to engage in a whole-school project that will measure the success of a new Mathematics programme.

Managing my project as well as my daily duties was a challenge, but the support and valuable feedback of Laura Sabo was encouraging. Thank you, Laura, for being an outstanding mentor and listener. You were truly the best.

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## References

Alberta Learning. (2004). *Focus on inquiry: A teacher's guide to implementing inquiry-based learning.* Alberta: Learning Resources Centre.

Hill, M., & McGinnis, J. (2007). The curiosity in marketing thinking. *Journal of Marketing Education*, *29*(1), 52-62. https://doi.org/10.1177/0273475306297385

Kang, S.K. (2015). *The dolphin parent.* Toronto, Ontario, Canada: Penguin Books

Kashdan, T., Sherman, R., Yarbro, J., & Funder, D. (2013). How are curious people viewed and how do they behave in social situations? From the perspectives of self, friends, parents, and unacquainted observers. *National Center for Biotechnology Information Support Center*, *81*(2),142-154. https://doi.org/10.1111/j.1467-6494.2012.00796.x

Mackenzie, T. (2016). *Dive into inquiry: Amplify learning and student voice*. Irvine, CA: EdTechTeam Press.

Martin, A. (2013, November 10). *Coping with change: Teaching adaptability will help kids grow*. Retrieved from: http://theconversation.com/coping-with-change-teaching-adaptability-will-help-kids-grow-19726

Mertler, C. A. (2014). *Action research: Improving schools and empowering educators* (4th ed.). London, United Kingdom: Sage.

Reichert, M., & Hawley, R. (2010). *Reaching Boys Teaching Boys*. San Francisco, CA: Jossey-Bass.

Robinson, K., & Aronica, L. (2009). *The element: How finding your passion changes everything*. [Executive Summary]. Soundview Executive Book Summaries.

Stringer, E. T. (2014). *Action Research* (4th ed.). London, United Kingdom: Sage.

von Stumm, S., Hell, B., & Chamorro-Premuzic, T. (2011). The hungry mind: Intellectual curiosity is the third pillar of academic performance. *Perspectives on psychological science*, *6*(6), 574-588. https://doi.org/10.1177/1745691611421204.

Wiggins, G., & McTighe, J. (2005). *Understanding by design* (2nd ed.). Danvers, MA: Association for supervision and curriculum development.