Exploring the Role of Classroom-Based Assessments in Fostering Higher Order Thinking Skills in an All-Girls School: Challenges and Opportunities

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Exploring the Role of Classroom-Based Assessments in Fostering Higher Order Thinking Skills in an All-Girls School: Challenges and Opportunities

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Abstract

This study investigates the role of Classroom-Based Assessments (CBAs) in fostering Higher-Order Thinking Skills (HOTS) in an all-girls post-primary school in Ireland. Using a qualitative methodology, data was collected through five semi-structured interviews with teachers of six subjects and analysed using a thematic analysis framework. The findings indicate that CBAs can enhance HOTS, with particularly positive outcomes for high-achievers. However, logistical issues, teacher training, and large class sizes may mitigate their effectiveness. This research exposes a lack of confidence among girls undertaking Maths CBAs, while highlighting the need to seamlessly integrate CBAs into curricula. Overcoming these challenges is key to maximising the effectiveness of CBAs in developing HOTS.

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List of Acronyms and Abbreviations

CBA: Classroom-Based Assessments

CPD: Continuing Professional Development

DES: Department of Education and Skills

ERSI: The Economic and Social Research Institute

FA: Formative Assessments

HOTS: Higher-Order Thinking Skills

JCPA: Junior Cycle Profile of Achievement

JCT: Junior Cycle for Teachers

NCCA: National Council for Curriculum and Assessment

OECD: Organisation for Economic Co-operation and Development

PBL: Project-Based Learning

PD: Professional Development

PISA: Programme for International Student Assessment

SEC: State Examinations Commission

SEN: Special Educational Needs

SLAR: Subject Learning and Assessment Review

Chapter 1: Introduction

1.1 Origin of the Project

The origin of this research project stems from my experience as a post primary teacher within the Irish educational system. Observing the implementation of CBAs under the Junior Cycle framework, I became particularly interested in their capacity to foster HOTS. My experience in an all-girls school prompted me to reflect on the potential challenges and opportunities of implementing CBAs in this context. This initiated an investigation of how CBAs could be applied to enhance critical thinking, problem-solving, and inclusiveness among this cohort across a range of subjects.

1.2 Background to the Project

The educational landscape in Ireland has undergone significant transformations, particularly with the introduction of CBAs in the Junior Cycle. This shift aligns with 21st century educational goals of promoting critical thinking, creativity, and inclusiveness (Bell, 2010; DES, 2012a; DES, 2015; NCCA, 2015; NCCA, 2017). CBAs are designed to move beyond traditional rote learning, encouraging students to engage deeply with the material through formative assessments (FAs). This study situates itself within this evolving context, focusing specifically on how CBAs contribute to the development of HOTS in an all-girls school.

1.3 Rationale and Research Aims

The significance of this research lies in its potential to inform educational practices and policies aimed at enhancing student outcomes, particularly in the context of gender disparities. The Programme for International Student Assessment (PISA) results have consistently highlighted that while Irish students perform well overall, there are some gender differences in achievement, especially in Mathematics. Girls in Ireland have been found to score lower than boys in Mathematics, despite performing equally well or better in other areas (Smyth, 2015; OECD, 2023).

Additionally, Andreas Schleicher, the director for education and skills and special adviser on education policy at the Organisation for Economic Co-operation and Development **(**OECD), has critiqued the Irish education system, despite high PISA scores, for catering mainly to the average student. Schleicher notes that Ireland has fewer high-achieving students compared to other

countries and advocates for assessments that show how learners can apply knowledge dynamically (O'Brien, 2024).

By examining the implementation of CBAs in an all-girls school, this study aims to investigate the potential of these assessments to foster HOTS, reveal gaps and gender disparities and promote inclusive education. The research aims are twofold:

1. To investigate how CBAs in the Junior Cycle framework specifically contribute to fostering HOTS in an all-girls school.
2. To identify the challenges and opportunities presented by the implementation of CBAs in an all-girls school.

The purpose of this study is to provide a nuanced understanding of how CBAs can be effectively integrated into the curriculum to enhance the development of HOTS in all students. The motivation for this research is rooted in the need to support teachers in implementing CBAs and to ensure that these assessments are inclusive and equitable. By exploring the specific context of an all-girls school, this study seeks to contribute to the broader discourse on gender-responsive educational practices.

1.4 Dissertation Layout

The remaining chapters of this thesis are structured as follows. Chapter Two reviews relevant literature on CBAs, HOTS, and gender dynamics in education. It discusses the theoretical frameworks underpinning the study, including Bloom's Taxonomy and Dewey's philosophy of experiential learning. Chapter Three outlines the research design, data collection methods, and analytical approaches used in the study. Chapter Four presents the findings from five interviews conducted with teachers, identifying key themes and patterns. Chapter Five interprets the findings in light of the research questions and relevant literature, discussing the implications for educational practice. Finally, Chapter Six summarises the key findings, discusses their significance, and provides recommendations for future practice and policy.

1.5 Conclusion

This chapter has provided an overview of this research project, highlighting the study's origin,

significance and aims. It has established the context for the research in consideration of policy and literature and outlined the structure of the remaining chapters. The next chapter will review relevant literature, synthesising existing research on CBAs, HOTS, and gender dynamics in education.

Chapter 2: Literature Review

2.1 Introduction

This literature review examines the transformative changes in Ireland's Junior Cycle programme, typified by the introduction of CBAs and their alignment with 21st century educational goals (Bell, 2010; DES, 2012a, 2015; NCCA, 2015, 2017). The review will contextualise the research, evaluate relevant literature, foreground general findings and explore the theoretical framework. It will also discuss the history and evolution of the CBAs, teacher perceptions and implementation, and the specific context of an all-girls school. The chapter concludes with insights drawn from the literature.

2.2 Contextualising the Research

Delving into broader shifts in Ireland's educational paradigms, this review emphasises the role and evolution of CBAs. These FAs are examined for their potential to cultivate HOTS as outlined in the revised Bloom's Taxonomy, encompassing skills such as applying, analysing, evaluating, and creating (Anderson and Krathwohl, 2001). This investigation will be conducted within an all-girls school, focusing on the nuances of how CBAs are implemented and their value in enhancing complex cognitive abilities, while also examining what role, if any, gender plays in these educational outcomes.

2.3 Approach to Reviewing and Evaluating Literature

Adopting a thematic analytical approach, this review aims to identify trends, gaps, and insights within existing research on CBAs. The goal is to synthesise and critically evaluate the role of CBAs in the Irish education system within an all-girls school context, offering direction for future research and educational practice.

2.4 Foregrounding General Findings

Preliminary insights indicate a need for more in-depth research into the deployment of CBAs within educational settings, as opposed to a study of Junior Cycle reform as a whole (McGarr et al., 2023). A central focus of this investigation is their capacity to foster HOTS, especially in the context of the latest PISA report (OECD, 2023). This report's findings regarding Ireland's educational performance, as well as some enduring gender disparities in outcomes (Marta and

Michelle, 2023), highlight the relevance of evaluating CBAs' usefulness in nurturing advanced cognitive skills.

Building on this background, this study is guided by two research questions:

1. How do CBAs in the Junior Cycle framework specifically contribute to fostering HOTS in an all-girls school?

2. What are the challenges and opportunities presented by the implementation of CBAs in an all-girls school?

2.5 Theoretical Framework

2.5.1 Bloom's Taxonomy and HOTS

Developed by Benjamin Bloom and his colleagues in the mid-20th century, Bloom's Taxonomy has become a foundational model in education, widely recognised for its structured categorisation of cognitive skills. It classifies cognitive abilities according to a hierarchy, ranging from basic knowledge recall to more complex levels such as analysis, synthesis, and evaluation (Bloom et al., 1956).

The hierarchical structure of Bloom's Taxonomy has been a topic of scholarly discussion regarding its validity. While some educators and researchers consider this hierarchy a useful tool in curriculum design and assessment (Anderson and Krathwohl, 2001), others argue that learning is a more interconnected process where higher-order skills do not necessarily build upon lower-order skills in a linear manner (Krathwohl, 2002). As an alternative, Guilford (1967) proposes a model of intellect with multiple abilities, not a strict hierarchy. Shulman (1986) highlights its neglect of pedagogical content knowledge, central to effective teaching. Wilson (2016) critiques it for overlooking affective and psychomotor domains critical for holistic education. Despite these debates, Bloom's Taxonomy remains widely used in educational settings worldwide (Forehand, 2010; Seaman, 2011).

The taxonomy's influence extends to Junior Cycle reform in Ireland, where the National Council for Curriculum and Assessment (NCCA) has emphasised skills like critical thinking and creativity, aligning with the higher levels of Bloom's Taxonomy (NCCA, 2015). This reflects a broader

educational shift to move beyond rote memorisation to encourage deeper engagement with learning material. It encourages educators to create learning environments that promote skills essential for the 21st century. This approach is considered particularly relevant in the era of rapid technological advancement and information availability, where critical thinking, problem-solving skills, and the ability to devise solutions for unforeseen problems are increasingly valued (DES, 2012b; NCCA, 2015; OECD, 2015, 2018).

Bloom's Taxonomy is closely aligned with cognitive learning theories, which highlight the importance of processes like understanding, applying, analysing, and creating knowledge (Brookhart, 2010, 2013). Arguably, these cognitive processes are fundamental to the development of HOTS, essential for enabling students of all academic abilities to effectively tackle complex problems and engage in critical thinking leading to improvements in learning outcomes (Zohar and Dori, 2003).

The inclusion of Bloom's Taxonomy and HOTS in this study is justified by their widespread application and relevance in educational theory and practice. Their role in shaping assessment strategies, particularly reforms like the Junior Cycle, highlights their importance in addressing contemporary educational challenges and opportunities.

2.5.2 Dewey's Philosophy and Experiential Learning

John Dewey, a prominent figure in the philosophy of education, is widely recognised for his influential concepts of experiential learning and democracy in education (Dewey, 1916; Johnston, 2006; Sadovnik et al., 2017). His pragmatic approach, emphasising learning by doing, growth, and the democratic involvement of students in their own education, aligns closely with contemporary educational reforms, including the Junior Cycle (Dewey, 1916; Dewey, 2013; Girvan et al., 2016).

Dewey critiqued traditional pedagogies such as rote learning and favoured enquiry-based, student-centred learning (Radu, 2011). Junior Cycle reform, outlined in the *Framework for the Junior Cycle* (DES, 2015), reflects these principles by emphasising engagement with content, fostering understanding and retention through real-world applications, and promoting independence in learning (Cross-Durrant, 2001; DES, 2015). Dewey advocated for democratic classrooms where students have a say in their learning, thus avoiding passive spectatorship (Dewey, 1938; Saltmarsh, 1996). This philosophy resonates with the Framework's principles of 'Choice and flexibility' and 'Inclusive education', targeting broad participation and outcomes for all students (DES, 2015).

The connection between enquiry, practical problem-solving, and activity is mirrored in the Junior Cycle's focus on 'active learning' and 'engagement and participation', encouraging curriculum assessment practices that aspire to generate enthusiasm and participation (DES, 2015; Dewey, 1916). Dewey's endorsement of experiential education and reflection is aligned with the Junior Cycle's introduction of CBAs, which prioritise student choice and reflectivity as part of the learning process (DES, 2015; Dewey, 1980; Fallace, 2016). This approach encourages students to engage deeply with content, fostering understanding and retention through practical applications, reflecting Dewey's vision of education as a tool for personal and societal transformation (Dewey, 1938; Murchan, 2021).

However, Dewey's philosophy is not without its critics. Some argue that his emphasis on experiential learning can result in a lack of structure and rigour in the educational process, potentially disadvantaging students who thrive under more structured approaches (Fishman, McCarthy 1998). Additionally, Dewey's ideal democratic classroom has been critiqued for being difficult to implement, especially in diverse classrooms where the accent on student autonomy may create challenges (Norris, 2004).

Despite these critiques, Dewey's influence in shaping educational practices that promote HOTS is significant. For instance, Rodgers (2002) discusses Dewey's concept of reflective thinking, a fundamental aspect of HOTS, highlighting the importance of reflection in the learning process, which also plays a significant role in Junior Cycle reforms and CBAs (DES, 2015; Dewey, 1933). This alignment of Dewey's educational principles with Junior Cycle reforms and CBAs reflects an educational paradigm evolving towards a more holistic educational approach. The emphasis lies in acquiring knowledge together with developing skills to apply, analyse, and create new understandings (DES, 2015; OECD, 2018). Integrating Deweyan methods in CBAs presents opportunities to engage students in active learning to develop reflective and critical thinking skills considered essential in today's complex world (Girvan et al., 2016). This study explores how incorporating Dewey's experiential learning approach in CBAs could cultivate HOTS compatible with contemporary educational objectives.

2.6 History and Evolution of Classroom-Based Assessments

Curriculum studies in Ireland recognise the need to equip students effectively for life, enterprise culture, and European citizenship (Green Paper, 1992). PBL encourages students to learn through

engaging in complex questions or challenges (Bell, 2010). FA involves ongoing assessments to enhance student learning (Black & Wiliam, 1998). Both PBL and FA emphasise real-world learning, personalised experiences, and skill development, aligning with evolving curriculum requirements (Chen & Yang, 2019; Darling-Hammond, 2010). Incorporating aspects of PBL with an emphasis on self-reflection, CBAs are designed to promote FA practices (DES, 2015; NCCA, 2017).

Effective instructional strategies play a critical role in fostering successful teaching and learning (Darling-Hammond and Richardson, 2009). With roots in Deweyan experiential learning (Krajcik and Blumenfeld, 2006), PBL and FA have garnered considerable support as valuable instructional approaches promoting active, personalised learning experiences (Chen and Yang, 2019). PBL aims to stimulate student motivation and participation by leveraging internal drives (Krajcik et al., 2006; Lam et al., 2009), while FA shifts the focus from content-laden teaching to student-centred learning, nurturing engagement and ownership of learning (Brookhart et al. 2009; Hattie, 2012; OECD, 2010).

Research has generally demonstrated the positive impact of PBL on adolescents' academic and socio-emotional development, although some critiques suggest variability in outcomes based on implementation quality (Hmelo-Silver, 2004; Krajcik and Blumenfeld, 2006). Krajcik and Blumenfeld's study (2006) found that adolescents engaged in PBL activities showed increased motivation, leading to improved academic performance. Furthermore, FA practices have been shown to enhance adolescents' self-regulation and metacognitive skills (Nicol and Macfarlane-Dick, 2006). Closely related to PBL, CBAs are designed to encourage students to engage in analytical, evaluative, and creative tasks, thereby promoting these advanced cognitive skills. This aligns with curriculum reform objectives discussed by Murchan (2018) and the broader educational shifts in assessment policy described by MacPhail, Halbert, and O'Neill (2018). This study aims to gain a deeper understanding of how CBAs contribute to the development of HOTS, particularly focusing on their implementation by experienced teachers in a range of subjects in an all-girls school.

2.7 Teacher Perceptions and Implementation of CBAs

The implementation of CBAs in the Junior Cycle framework has significantly impacted teachers'

pedagogical approaches. A recent longitudinal study by McGarr et al. (2023) has assessed challenges associated with implementation. While students reported additional stress with the new Junior Cycle workload, besides the dual challenges presented by formative and summative assessments in a hybrid curriculum (Gleeson, 2010; Murchan, 2021), the research indicates a positive shift towards student-centred, student-led teaching and learning. Students and parents welcomed group and project-based work, the focus on skills and 'real-life' learning (McGarr et al., 2023; O'Brien, 2023).

Teachers reported benefits of increased professional collaboration but noted a significant gap between the Junior and Senior Cycles in workload, student expectations, and exams. Arguably. the focus on summative assessments and high-stakes exams undermines the potential of Junior Cycle reform and CBAs (Gleeson, 2023). Some teachers also find it challenging to implement CBAs effectively due to time constraints and possible resistance to change (McGarr et al., 2023; Murchan, 2018).

Adequate support and training for teachers could improve the success of CBAs (Kirk, 2018). Darmody, Lysaght, and O'Leary (2020) highlight teachers' mixed perceptions of new assessment practices, emphasising the need for high teacher assessment literacy. This aligns with the McGarr et al. (2023) study, where PD played a pivotal role in adapting to the CBA format. Engagement with PD was significant, especially through the Junior Cycle for Teachers (JCT) programme. Teachers appreciated opportunities for sharing practices and found resources and practical examples supportive (McGarr et al., 2023).

Though these studies provide valuable insights, there are gaps in understanding the long-term impact of these reforms. All these concerns are beyond the scope of this study, but more in-depth research appears merited, particularly considering the reforms are relatively recent. There remains a need to explore specific links between CBAs and the promotion of HOTS.

2.8 CBAs in an All-Girls School

The introduction of Junior Cycle Reform in Ireland was initiated to enhance the quality of education and assessments, prioritising a holistic approach that promotes emotional, social and academic development (DES, 2015; NCCA, 2017).

Dr Emer Smyth's work at the Economic and Social Research Institute (ESRI) has been influential in shaping educational policy, including Junior Cycle reform. Dr Smyth conducted extensive research on education in Ireland, including gender disparities, student experiences, and educational outcomes. Research consistently showed that girls were achieving better academic results than boys, particularly in reading and literacy (NCCA, 2011; OECD, 2008; Smyth et al., 2006, 2007). This academic disparity raised awareness of the need to adapt assessment methods to meet the specific needs of all students.

Single-sex girls' schools in Ireland are often perceived as achieving higher academic performance (Lynch and Lodge, 2002). Accordingly, obtaining top exam scores and university admission would appear to hold significant value for students and parents in these institutions. However, recent research by Clavel and Flannery (2023) indicates no significant academic advantage for students in single-sex schools compared to mixed schools, after adjusting for socioeconomic factors. This finding highlights the need to explore other factors that contribute to educational success. Researching the introduction of FA could offer insights into how these educational strategies are implemented to enhance learning experiences and outcomes.

In all-girls schools, CBAs incorporating PBL can potentially cater to girls' learning preferences, emphasising collaboration, communication, and critical thinking (Doyle, 2023). In addition to assessing academic performance, CBAs may enhance engagement and motivation through student choice and agency (NCCA, 2017; Noddings, 2003). Research indicates that female students, particularly in PBL contexts, show higher motivation and engagement. This could be leveraged to address gender disparities, especially in STEM fields where girls remain underrepresented (Doyle, 2023; Ertl et al., 2017; OECD, 2012; Tanaka, 2023; Vaz et al., 2013).

The imperatives of the Junior Cycle Reform in Ireland, highlighted by recent PISA findings, would appear to confirm the importance of evolving assessment practices to foster a more inclusive and equitable educational environment. The 2022 PISA results, which positions Irish students as leaders in literacy among OECD and EU countries, ostensibly affirm the effectiveness of Ireland's current educational strategies. PISA, which is designed to evaluate the knowledge and skills of 15 and 16-year-old students in Mathematics, reading, and Science, provides insights into how well education systems prepare students for real-life challenges and future success (OECD, 2023).

While Ireland demonstrates above-average performance in Mathematics and Science, the findings also suggest a need to maximize student potential, particularly among high achievers. This context increases the relevance of exploring how CBAs can specifically contribute to fostering HOTS in students. Notably, the PISA 2022 results show that female students still significantly outperform male students, but male students retain higher mean scores in Mathematics. These ongoing disparities underscore the government's commitment to promoting STEM education, particularly for female students, in addition to enhancing overall literacy, numeracy and digital literacy.

2.9 Conclusion

This literature review has examined the introduction of CBAs within Ireland's Junior Cycle framework, focusing on their compatibility with contemporary educational goals and application in an all-girls school. Central to this review has been the exploration of whether CBAs foster HOTS and impact gender disparities in education, underpinned by foundational theories such as Bloom's Taxonomy and Dewey's philosophy of experiential learning.

Literature reviewed highlighted the role of PBL in promoting critical thinking, creativity, and potential to enhance student engagement and motivation. As a close relation of PBL, it can be inferred that similar conclusions can be applied to CBAs. This study will endeavour to confirm or add nuance to the understanding of whether CBAs effectively nurture HOTS in an all-girls school, thereby contributing to the ongoing discourse on educational methodologies and their outcomes.

The review's findings align with recent PISA results, which suggest a need for educational strategies that cater to the needs of female students in Mathematics. This aligns with the Irish government's response to PISA 2022 in the STEM Education Implementation Plan (DES, 2024). Interestingly, the findings also suggest that targeted strategies are required to support the progress of gifted students, a concern directly addressed in my study on the effectiveness of CBAs in developing HOTS.

Informed by the reviewed literature, this study aims to answer two pivotal research questions: How do CBAs in the Junior Cycle framework specifically contribute to fostering HOTS in an all-girls school? What are the challenges and opportunities presented by the implementation of CBAs in an all-girls school?

Chapter 3: Methodology

3.1 Introduction

This study employs a qualitative research approach to investigate the implementation and impacts of CBAs in fostering HOTS within an all-girls school. The research focuses on understanding the nuanced dynamics of how CBAs are deployed, the pedagogical strategies that support or limit their effectiveness, and educational outcomes from the perspective of teachers. It aims to explore the challenges and opportunities presented by CBAs, assess their alignment with contemporary educational theories, and generate insights that can inform educational policy and practice.

This chapter outlines the research design and evaluates the methods of data collection used in the study. It discusses the selection of participants, the means employed to gather data, and procedures followed during data collection. The chapter also details the thematic data analysis process and addresses ethical considerations relevant to the research. Finally, it highlights the study's limitations and concludes with a summary of the methodological approach adopted.

3.2 Aims and Objectives

Aim: The primary aim of this study is to critically analyse the implementation and impacts of CBAs in fostering HOTS within an all-girls school.

Objectives:

1. To explore the pedagogical integration of CBAs: assess how CBAs are implemented in an all-girls school and their compatibility with fostering HOTS.
2. To evaluate challenges and opportunities: investigate the educational environment of an all-girls school, focusing on teacher perspectives and institutional constraints in implementing CBAs.
3. To assess theoretical alignment: examine the alignment of CBAs with contemporary educational theories such as Bloom's Taxonomy and Dewey's experiential learning, and their practical application in real-world teaching scenarios.
4. To generate policy and practice insights: provide recommendations that can inform educational policy and practice to enhance CBA design and implementation to better meet the needs of students in an all-girls school.

3.3 Research Design and Approach

This research is grounded in the qualitative research paradigm (Creswell and Poth, 2016), which facilitates an in-depth exploration of the complex, lived experiences of educators within an all-girls school context. This approach is relevant for investigating the complexities of CBAs and their connections with the institutional culture, pedagogical strategies, and individual experiences of both teachers and students.

The interpretivist paradigm, as articulated by Merriam (2002) and Denzin and Lincoln (2011), underpins this research, positing that reality is a construct of human interactions and experiences. This perspective is critical for investigating the subjective perceptions and experiences of educators. The interpretivist approach supports a qualitative methodology, which is adept at exploring the nuanced intricacies inherent in educational phenomena (Cohen, Mannion and Morrison, 2002)).

The choice of a qualitative research design over quantitative or mixed methods is deliberate. Quantitative approaches, while offering statistical generalisability, often overlook the depth and contextual nuances of participants' experiences (Creswell, 2017). Mixed methods, despite their comprehensive nature, may not be necessary for the depth of understanding sought in this study, especially considering the resource-intensive nature of such approaches (Bryman and Cramer, 2012; Johnson, Onwuegbuzie and Turner, 2007). The essence of this research lies in comprehensively understanding the experiences and perceptions of teachers, which may be effectively achieved through a qualitative inquiry that captures the depth, subtleties and complexities of educational phenomena (Creswell, 1998).

3.4 Participant Selection and Sampling

The purposive sampling strategy was intentionally selected for this study to include experienced teachers from six subject areas - English, History, Art, Music, Maths and Science - within an all-girls school. This approach is based on the understanding that experienced educators bring a depth of pedagogical knowledge and insights into the implementation and impact of CBAs across different disciplines. Patton (2014) suggests that purposive sampling allows researchers to select participants most likely to provide strong, valuable data pertinent to the research objectives. Particularly relevant for exploring the nuanced perceptions and challenges associated with CBAs, experienced teachers can provide detailed accounts of the opportunities and challenges in fostering

HOTS among students.

The diversity of subjects reflects curricula range and represents a calculated attempt to uncover varied pedagogical approaches within the all-girls school. Teachers from different disciplines offer distinct perspectives on how CBAs influence teaching and learning dynamics, potentially revealing subject-specific challenges and opportunities in promoting HOTS. This variety of viewpoints is essential for enhancing the study with a broad spectrum of insights and experiences.

One specific reason for selecting two Maths teachers stems from recent findings in the PISA 2022 study, which indicate that girls in Ireland generally perform equally well or outperform boys in most subjects except for Maths, where they still lag slightly behind (OECD, 2023). This focus aims to explore whether CBAs can address this gender disparity in Maths performance within an all-girls school.

3.5 Pilot Study

Before the main data collection phase, a pilot study was conducted to refine the interview procedure and confirm the clarity and relevance of interview questions. This preliminary phase involved conducting interview sessions with two teachers with substantial teaching experience. This approach aligns with recommendations by Bell and Waters (2018), who emphasise the importance of piloting in qualitative research for testing the research instruments. The pilot study revealed areas where interview questions could be more pertinent to undercovering data relevant to the research questions, leading to modifications for greater clarity. Feedback from the pilot participants also suggested the addition of prompts to explore deeper reflections on the impact of CBAs on student engagement and learning outcomes. Adjustments made post-pilot ensured the interview questions were more focused, facilitating detailed responses relevant to the research objectives (Cohen, Manion, & Morrison, 2013).

3.6 Data Collection

Five semi-structured interviews were conducted to gather qualitative data. Each interview lasted approximately 30-45 minutes and was audio-recorded with the consent of participants. The interviews were then transcribed verbatim for analysis. The open-ended nature of questions allowed participants to discuss their experiences and perspectives in depth, providing valuable qualitative data for thematic analysis (Kvale and Brinkmann, 2009).

3.7 Data Analysis

Thematic analysis, supported by Braun & Clarke (2006), offers a methodical and flexible framework suitable for deciphering qualitative data derived from interviews. This approach is primed for the extraction and interpretation of complex narratives, enabling the distillation of these narratives into coherent themes that resonate strongly with this study's core objectives. Specifically, the thematic analysis begins with the initial coding of data, where data fragments are labelled with codes succinctly describing them. This first step is essential for organising data into manageable units for further analysis.

Following initial coding, the analysis proceeds to theme development. This phase involves the grouping of related codes into potential themes that capture significant patterns in the data relevant to the research questions. Themes represent deeper insights that emerge from the data, capturing the essence of the teacher-participants' experiences with CBAs in an all-girls school. This thematic development is associated with the interpretivist paradigm, as it allows for the emergence of meanings constructed by participants in their social context to provide a rich, nuanced understanding of CBA opportunities and challenges and the strategies employed by teachers (Clarke & Braun, 2017).

The presentation and interpretation of the data is supported by visual tools including thematic mapping, a pie chart, flow and bar charts. The use of these visual aids will help highlight significant patterns and trends, making the data more accessible and understandable for readers.

The potential for researcher bias represents a critical consideration in qualitative analysis, particularly given its interpretive nature. To mitigate this, the study will employ strategies such as peer debriefing. This entails discussing the analytical process and findings with peers or mentors who can provide alternative interpretations and challenge the researcher's assumptions, further safeguarding the integrity and trustworthiness of the analysis (Morse, 2015).

3.8 Ethical Considerations

In conducting this research, a comprehensive approach to ethical considerations is of the highest import, particularly given the potential sensitivities involved in discussing educational strategies and outcomes in an all-girls school. Adherence to the British Educational Research Association (BERA, 2018) ethical guidelines forms the foundation of this study's ethical protocol. These

guidelines emphasise the importance of informing all participants about the study's purpose, obtaining their consent, and ensuring their rights to anonymity and confidentiality throughout the research process.

In addition to these foundational ethical practices, the research design includes several measures aimed at safeguarding participant privacy and managing sensitive information with the greatest care. Firstly, all participant data will be anonymised, removing any identifiable material from the findings. This ensures that participants' contributions cannot be traced back to them, thus protecting their privacy (BERA, 2018). To maintain clarity and anonymity, teachers are referred to as Teacher 1 (T1), an English teacher; Teacher 2 (T2), a History teacher; Teacher 3 (T3), a Maths teacher; Teacher 4 (T4), an Art teacher; and Teacher 5 (T5), a Maths and Science teacher.

Confidentiality will be rigorously maintained, with all collected data securely stored and accessible only to the researcher. Any electronic data will be encrypted, following best practices for data security as recommended by BERA (2018). Participants will also be informed of their right to withdraw from the study at any point, without any penalty or impact on their professional standing. This assurance is key to fostering an environment of trust where participants feel comfortable sharing their experiences and perspectives.

3.9 Limitations

Though meticulously designed, the study is subject to several limitations that must be acknowledged to contextualise the findings and understand the potential constraints on their transferability and applicability.

1. Sample size and scope: The study focuses on one all-girls school with a specific cultural and educational context. While this provides in-depth insights into the implementation of CBAs within this setting, it limits the transferability of the findings to other educational environments, such as co-educational schools or schools with different socio-economic backgrounds.
2. Qualitative nature of the study: The reliance on qualitative data, gathered through semi-structured interviews, offers detailed narratives but lacks the statistical generalisability of quantitative research. The insights gained are entirely contextual and may not be applicable to broader populations without corroborating studies.

3. Potential for researcher bias: Given the interpretivist nature of the study, there is an inherent risk of researcher bias in data collection and analysis. Despite employing practices such as peer debriefing to mitigate this risk, the researcher's interpretations and interactions with participants may still influence the findings.
4. Variability in teacher experience and perspectives: The purposive sampling strategy aimed to include experienced teachers across diverse subjects. However, the individual differences in teaching styles, experience and personal beliefs about CBAs may introduce variability that affects the consistency of data. This diversity, while enhancing the study, also adds complexity to the interpretation of the findings.
5. Limited subject coverage: Although the study includes teachers of six subjects, the selection is not exhaustive. Subjects such as Physical Education, Technology, or Modern Foreign Languages, which might have unique interactions with CBAs, are not represented. This could limit the understanding of CBAs' effectiveness across the comprehensive curriculum spectrum.
6. Temporal constraints: The study was conducted over a specific period, which may not capture the long-term impacts of CBAs on student learning and teacher practices. Longitudinal studies are needed to assess the enduring effects and sustainability of the observed outcomes.

By acknowledging these limitations, the study provides a transparent and balanced view of its findings, laying the groundwork for future research to address these constraints and expand on the insights gained. Despite these limitations, the study contributes valuable understanding to the discourse on CBAs and their role in fostering HOTS within an all-girls school.

3.10 Conclusion

The methodology adopted for this study is both robust and designed to address the nuanced complexities of exploring CBA implementation in an all-girls school. Through qualitative interviews and thematic analysis, this research is poised to contribute meaningfully to the discourse on effective educational practices, highlighting the potential of CBAs to enhance learning outcomes and foster an environment conducive to the development of HOTS among students.

Chapter 4: Findings

4.1 Introduction

This chapter presents the findings from interviews conducted with five teachers of six subjects: English (T1), Music & History (T2), Maths (T3), Art (T4) and Maths & Science (T5). The study explores the role of CBAs in fostering HOTS and the challenges and opportunities associated with their implementation in an all-girls school.

The data analysis strategy employing Braun and Clarke's (2006) thematic analysis framework provided a systematic approach for identifying and analysing key themes across the qualitative data. The analysis is guided by the following research questions:

1. How do CBAs contribute to fostering HOTS in an all-girls school?
2. What are the challenges and opportunities presented by the implementation of CBAs in an all-girls school?

The findings are organised into five main themes:

1. Fostering / Not Fostering HOTS
2. Challenges to Implementation
3. Opportunities in Implementation
4. Inclusiveness
5. Girls and CBAs: Gender Dynamics and Confidence Issues

Throughout the chapter, the findings are illustrated with figures, charts and direct quotations from interviewees. This approach ensures a detailed summary, capturing the complexity of the teachers' experiences with CBAs. It also strengthens the trustworthiness of the findings by triangulating different data sources, thereby offering a more nuanced understanding of the research outcomes.

Figure 1: Thematic Map of Key Findings

The thematic map shows interconnections between the main themes and codes. Reading from the left to right, specific codes are linked to their identified themes. Interconnected themes are colour-coded for clarity.

4.2 Theme 1: Fostering HOTS

Fostering HOTS through CBAs emerges as a key theme for student development and engagement. HOTS, which include critical thinking, problem-solving, and reflective practices, are viewed as essential for preparing students to navigate complex real-world problems. This theme constituted 26% of the total references across the interviews.

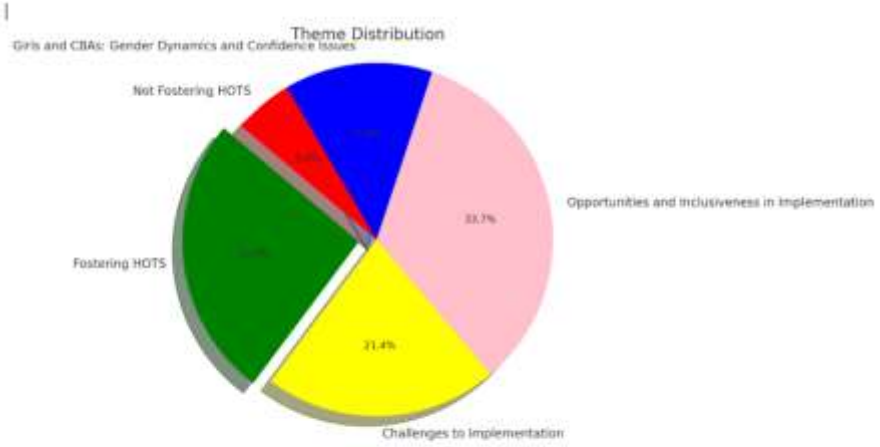

Figure 2: Distribution of Themes Across Interviews

The pie chart illustrates the distribution of quotes across different themes identified in the interviews. Each segment represents the proportion of quotes that fell under a specific theme, with each presented in the sections below.

4.2.1 Encouraging Learners to Think Outside the Box

CBAs were viewed by four of the teachers interviewed as particularly effective in promoting critical and creative thinking among students. T1 stated, “CBAs really push students to think in new and innovative ways, which is something traditional exams often fail to do”. This indicates that CBAs significantly enhance student creativity and engagement. T2 and T5 highlighted the role of CBAs in engaging student interests, prompting them to “think outside the box”.

Most teachers believe that allowing students to choose their topics fosters ownership of learning, promoting autonomy. T4 noted, “In every CBA, students are doing different things, which allows them to explore topics of personal interest”. The findings suggest that autonomy leads to deeper engagement, as students were observed to invest more effort when controlling their own projects.

4.2.2 Promoting Student Reflection, Continuous Feedback and Connection to Curriculum Topics

Most teachers viewed “ongoing reflection” as a key component of CBAs, allowing students to connect their projects to their own experiences, thus deepening their understanding. T2 explained, “Students are encouraged to connect their projects to real-world applications”. T1 noted that “reflective practices embedded in CBAs promote deeper understanding and retention of knowledge”. This recurring theme across interviews emphasises the importance of reflection in

fostering HOTS.

T4 and T5's positive views highlight the potential of CBAs to enhance critical thinking and engagement through reflective practices. T4 explained, "When you talk about your work, you're making connections that you don't necessarily see until you're forced to verbalise it or look at it in a holistic way". This suggests that "ongoing reflection" helps students "internalise their learning", making knowledge more meaningful and lasting. The success of CBAs in promoting HOTS is also linked by most teachers to the integration of continuous feedback and effective questioning. Teachers stressed the importance of embedding CBAs within the curriculum and using them as tools for ongoing learning rather than isolated assessments. These patterns suggest that reflection, feedback and student autonomy are key for the success of CBAs in fostering HOTS.

4.2.3 Misalignment with Curriculum and Negative Views

Despite these positive aspects, some teachers observed that the development of HOTS through CBAs is not consistent. T3, a Maths teacher, remarked, "The tasks often don't match the curriculum, making it hard for students to apply HOTS". T2 echoed this sentiment, "In theory, they align with HOTS, but in practice, it's difficult to achieve with large class sizes and limited feedback opportunities". T1 stressed that success in fostering HOTS "depends on the teacher and on the nature of the tasks," indicating significant variability based on individual teacher practices and context. Additionally, T1 and T2 suggested that CBAs often benefit "naturally inclined" students.

4.2.4 Subject-Specific Variations

Findings suggest that the effectiveness of CBAs in fostering HOTS varies significantly by subject. Art and Music teachers (T2, T4) noted greater success due to the creativity and reflection inherent in these subjects. T4 highlighted, "There's loads of critical thinking elements within art naturally". In Music, T2 observed: "They want to be there in the first place, which fosters HOTS". These findings illustrate how subject-specific factors, such as the nature of the discipline and student interest, can significantly enhance the effectiveness of CBAs in fostering HOTS. It is noteworthy that T3 is the only teacher who expresses a wholly negative view on the potential of CBAs to foster HOTS and offers most comments highlighting the reverse, as shown below in Figure 3.

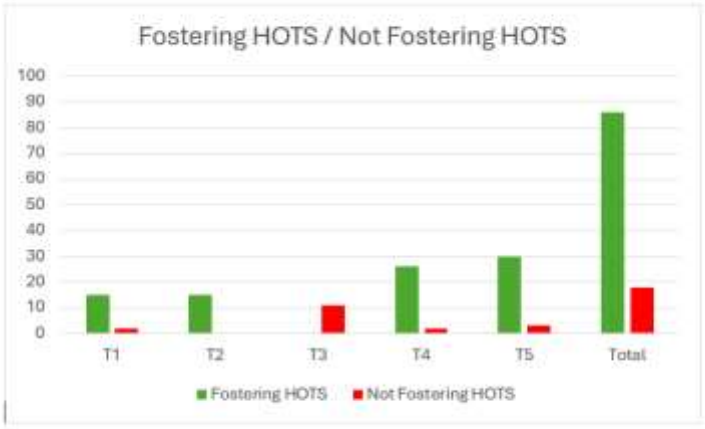

Figure 3.
Illustrates the distribution of quotes related to the theme of Fostering HOTS or Not Fostering HOTS across the five teachers interviewed.

Summary of Findings

The findings suggest that while CBAs have the potential to significantly foster HOTS, their effectiveness is contingent upon various factors, including class size, subject matter, teacher facilitation, curriculum integration, and continuous feedback. Overall, most teachers agree that CBAs promote HOTS, but they also highlight the need for improved curriculum alignment and resources to support effective implementation.

4.3 Theme 2: Challenges to Implementation

The implementation of new educational initiatives faces significant logistical, resource-based, and scheduling challenges that impact both teachers' delivery of the curriculum and students' engagement. Challenges were mentioned 21.4% of the time across interviews.

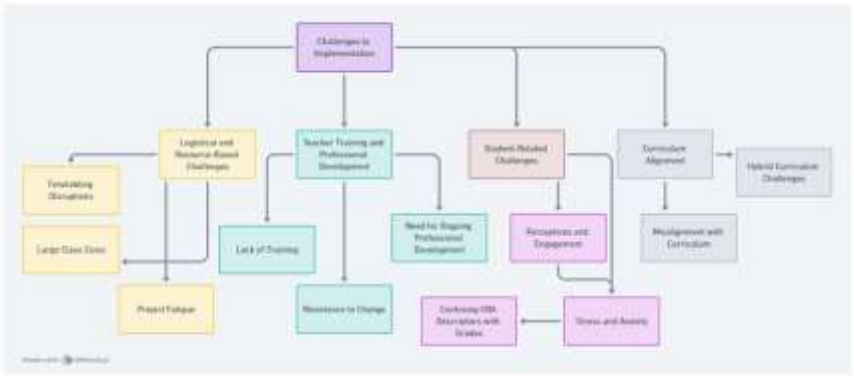

Figure 4. Flow Chart illustrating the various challenges to the implementation of CBAs. The main theme "Challenges to Implementation" is broken down into several colour coded categories presented in the sections below.

4.3.1 Logistical and Resource-based and Scheduling Challenges

Teachers highlighted issues such as timetabling disruptions and large class sizes. T1 noted the complexities of scheduling: "You plan to carve out three weeks before the department deadline… timetabling seems to be the biggest challenge". Large class sizes add another layer of difficulty. T2 explained: "The number of CBAs happening concurrently and students in the classroom are the two main challenges". Particularly impacting subjects like English and History, these teachers agreed that managing CBAs in large classes required additional resources and careful planning to ensure all students receive appropriate support. Teachers also observed that students often experience "project fatigue" when multiple CBAs are scheduled simultaneously. T5 described students becoming "numb" to the process, potentially reducing engagement and increasing anxiety. The findings suggest that logistical and resource-based challenges complicate the planning and allocation needed for effective CBA implementation.

4.3.2 Teacher Training and Professional Development

A significant challenge noted was the lack of adequate teacher training in PBL and assessment facilitation. T4 noted the importance of PD in helping teachers adjust to new methods: "Some teachers think they have to micromanage it…". T1, T4 and T5 stressed that teachers should *only* facilitate: "learning occurs in that process of making mistakes…" (T5). Most teachers interviewed were conscious of the need for a shift in teaching approaches towards facilitating independent

learning.

The need for standardisation was highlighted by T4 and T5 and they suggested PD could align teachers' understanding and application of CBA criteria. T4 stated: "Some teachers are seeing it as an exam…". T1 and T 4 emphasised the need for national and school coordinators to standardise the process and support teachers.

Overall, these insights suggest the critical need to nationally standardise CBA practices across schools to ensure consistent and fair assessments, benefiting both teachers and students.

4.3.3 Student Perceptions, Engagement, and Hybrid Curriculum

Student perceptions and engagement with CBAs are often characterised by frustration over the lack of traditional grading. T5 observed that students question the value of CBAs since they do not impact final grades, thereby affecting motivation: "They're not worth a percentage in the Junior Cycle". T4 highlighted misunderstanding about descriptors: "It's not graded… there's misunderstanding from teachers even more than students", which diminishes perceived value. T1 insisted the focus should be on learning and achievement: "I wouldn't create fear around them like it's an exam". T1 and T4 believe CBAs should contribute to a "holistic learning environment" with the emphasis on developing skills.

The integration of CBAs into a hybrid curriculum is seen to present unique challenges. T4 pointed out the "disconnect" between the State Examinations Commission (SEC) and the NCCA: "The NCCA's active learning approach doesn't translate to our unchanged system… it's square peg, round hole". T4 declares, "We've got two different curricula on top of each other". While T4 is decidedly vehement, all teachers expressed frustration involving the integration of CBAs into a system originally designed for high-stakes exams. These findings indicate the need for students to understand the value of CBAs beyond traditional grades to foster a positive attitude and boost student engagement.

4.3.4 Challenges for SEN Students

The implementation of CBAs poses challenges for students with SEN. T2 was especially aware of SEN students' "anxieties" regarding oral CBAs. This finding emphasises the need for

differentiated support to accommodate diverse needs. While not extensively mentioned, issues of resource allocation and the need for individualised approaches emerge as important issues across interviews.

Figure 5. This bar chart illustrates the number of quotes each teacher provided regarding the challenges to the implementation of CBAs. The total number of quotes across all teachers is also shown. Each teacher's contribution is represented in yellow, while the total is represented in orange.

Summary of Findings

Teachers highlighted logistical and resource issues like large class sizes, lack of resources, and scheduling difficulties, complicating CBA implementation. PD was repeatedly mentioned as essential for improved facilitation. Block-scheduling of CBAs highlighted the need for better coordination and planning. SEN students faced challenges, requiring differentiated and tailored supports. Confusion over descriptors versus traditional grades frustrated students and teachers, suggesting the need for clearer guidelines and alignment between continuous assessment and high-stakes exams.

4.4 Theme 3: Opportunities in Implementation

This theme, including inclusiveness, emerged as the most frequently cited, with teachers discussing opportunities 34% of the time. This indicates strong recognition of the potential benefits of successfully implementing CBAs.

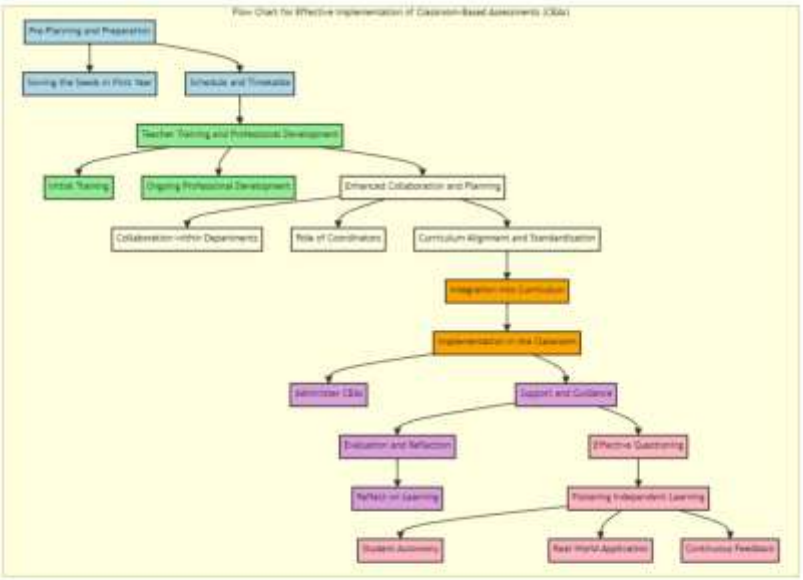

Figure 6: Flow Chart for Effective Implementation of Classroom-Based Assessments (CBAs)

This flow chart illustrates the comprehensive process for effectively implementing Classroom-Based Assessments (CBAs) in educational settings. It highlights the interconnected stages and elements necessary for successful execution. Colours indicate key connections.

4.4.1 Enhanced Collaboration and Pre-Planning

Enhanced collaboration and pre-planning were identified as essential components for the successful implementation of CBAs. Teachers consistently highlighted the benefits of collaboration and resource sharing within departments. T1 noted, “In a strong department, experienced people liaise with those who lack experience to share ideas”. T2 also noted that the presence of CBA coordinators monitoring planning and timetabling can significantly improve effectiveness. Findings suggest that effective collaboration fosters a culture of shared resources and best practice in CBA implementation.

4.4.2 Integration into the Learning Continuum

Integrating CBAs into the overall curriculum was highlighted as a key opportunity, frequently referenced across interviews. Early engagement with CBA-related activities was noted to improve student outcomes. T1 observed, “I incorporated more talking and listening activities”. Most teachers stressed the importance of students viewing CBAs as integral to their learning rather than

separate tasks. CBAs were felt to be “naturally” integrated into certain subjects: “Art CBAs are like other art projects” (T4). Findings suggest that integration helps make the assessments more manageable and meaningful for students.

4.4.3 Fostering Independent Learning

CBAs were frequently praised for their potential to foster independent learning. T1 stated, “CBAs allow students to work independently and choose their own topics with minimal instruction”. Teachers noted that CBAs help students see the relevance of their learning to real-world scenarios. T5 mentioned, “It’s akin to actually being a mathematician… Maths is more than just getting the right answers”. This suggests real-world application makes learning more engaging for students.

Summary of Findings

The findings reveal that CBAs offer significant opportunities for enhancing collaboration among teachers, integrating assessments into the overall curriculum, and fostering independent learning among students.

4.5 Theme 4: Inclusiveness

4.5.1 SEN Students

Inclusiveness emerged as an important theme. Teachers hailed the potential of CBAs to support diverse learning needs and promote equity among students. T2 stated that CBAs offer opportunities for SEN students to “blossom”, particularly in option subjects. T4 noted that Art CBAs allow students with varied abilities to succeed by engaging with different media. This suggests that CBAs can cater to the individual learning profiles of SEN students.

4.5.2 Cultural Expression and Relevance

CBAs allow students to explore and express their cultural backgrounds, enriching the learning experience for all. T2 and T4 highlighted the impact of culturally relevant projects: “History students often choose topics based on their cultural background, benefiting the whole class”. Findings suggest that integrating personal and cultural elements into CBAs helps students see the relevance of their education to their own lives and communities.

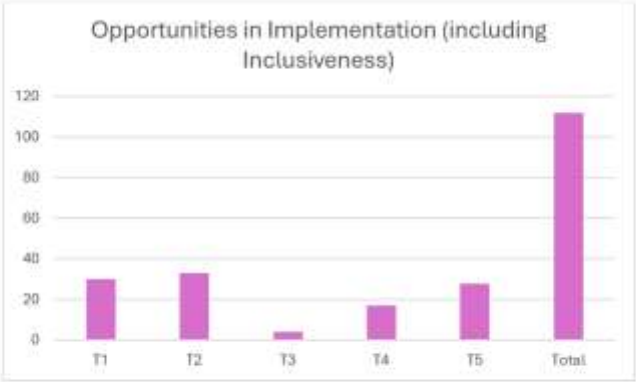

Figure 7. This bar chart illustrates the frequency of quotes related to the theme "Opportunities in Implementation (including Inclusiveness)" across all interviews. The data highlights that this theme is the most frequently discussed, indicating a strong recognition among teachers of the potential benefits and positive impacts of CBAs.

Summary of Findings

Most teachers were conscious of how CBAs support diverse learning needs and promote cultural relevance and inclusiveness.

4.6 Theme 5: Girls and CBAs: Gender Dynamics and Confidence Issues

The theme of gender dynamics and confidence emerged prominently, particularly regarding female students' experiences of CBAs in STEM subjects. This theme was mentioned most frequently by the two Maths teachers. It should be noted that both Maths teachers were experienced in implementing CBAs in co-educational and all-girls schools. The other three teachers had facilitated CBAs solely in all-girls schools.

4.6.1 Self-Doubt and Perfectionism

A recurrent issue identified was that "self-doubt" and "perfectionism" among female students hampered their engagement with CBAs. T5 noted, "I do notice that with girls you're more likely to hear: 'I can't do that. I can't do that'... They're afraid to make a mistake". T3 and T5 felt that this self-doubt impeded girls' willingness to engage fully with CBAs and take risks, impacting their performance.

4.6.2 Confidence in Mathematics and STEM

The issue of confidence was repeatedly evoked, particularly regarding Mathematics. A Maths

teacher, T5 believes that the collaborative nature of CBAs could help boost girls' confidence in a traditionally male-dominated subject. T5 observed of female students: "If someone lacks confidence, they're asking for help straightaway saying, 'I don't want to write anything down in case it's wrong". This teacher stresses the importance of fostering a "classroom culture" of "positive reinforcement" where mistakes are seen as a natural part of the learning process. However, T3 insisted that CBAs do not foster confidence in Maths: "I haven't witnessed girls' confidence in the subject...". It should be noted that this teacher did not permit group work on Maths CBAs, acknowledging the difficulties of monitoring individual contributions in Maths group work.

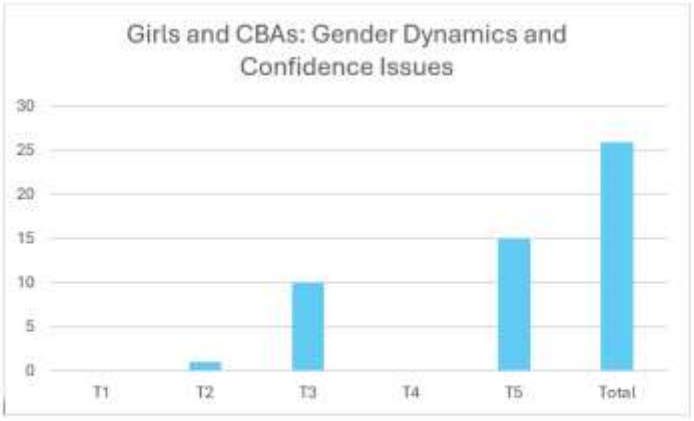

Figure 8: Girls and CBAs: Gender Dynamics and Confidence Issues - Bar Chart

This bar chart illustrates the number of quotes related to gender dynamics and confidence issues in the context of CBAs as expressed across interviews. The data shows that this theme is predominantly discussed by T3 and T5, emphasizing the challenges girls face in traditionally male-dominated subjects like Mathematics and STEM.

Summary of Findings

The data revealed key themes related to gender dynamics and confidence issues among girls in the context of CBAs. Self-doubt and perfectionism are prevalent, particularly in Maths, but it was suggested that targeted support and collaborative learning could help mitigate these challenges.

4.7 Conclusion

This chapter presented key findings on the implementation of CBAs in an all-girls school, based on interviews with five teachers. CBAs were found to enhance critical thinking, creativity, and reflection. However, their effectiveness varied by subject and was influenced by curriculum alignment and teacher practices. Significant challenges included scheduling disruptions, large class sizes, and the need for PD and standardisation. Student perceptions and project fatigue also posed barriers. Opportunities for improvement lay in enhanced departmental collaboration, coordinators maintaining schedules and pre-planning. Integrating CBAs into the global curriculum and fostering independent learning were seen as key opportunities. CBAs were seen to promote inclusiveness by supporting diverse learning needs and promoting equity. Gender dynamics and confidence issues for girls were highlighted in Maths. The data and findings in this chapter will be further discussed in Chapter 5 in relation to the research literature.

Chapter 5: Discussion

5.1 Introduction

This chapter critically discusses the findings of this study, interpreting them against the key issues identified in the literature (Bryman, 2016). It is structured by a critical analysis of the findings to explore the key themes that emerged from the data in relation to the research questions:

1. How do CBAs in the Junior Cycle framework specifically contribute to fostering HOTS in an all-girls school?
2. What are the challenges and opportunities presented by the implementation of CBAs in an all-girls school?

5.2 Fostering Higher-Order Thinking Skills (HOTS)

5.2.1 Encouraging Critical Thinking and Problem-Solving

The findings broadly indicate that teachers view CBAs as effective in promoting HOTS among students. This aligns with the educational objectives outlined in the literature, particularly the emphasis on fostering HOTS as part of 21st century educational goals (DES, 2012b; NCCA, 2015; OECD, 2015, 2018). Teachers reported that CBAs encourage students to engage in finding solutions to problems. For instance, all the teachers, except for T3, agreed that CBAs are inherently designed to "move beyond rote learning and engage student interests", prompting them to "think outside the box". This supports the theoretical framework of Bloom's Taxonomy, which categorises the importance of applying, analysing, and creating as higher-order cognitive processes (Anderson and Kraftwohl, 2001). The literature highlights the significance of nurturing these skills to prepare students for complex problem-solving and innovation in various contexts, such as STEM fields and real-world scenarios. (Zohar & Dori, 2003).

Indeed, all teachers, excepting T3, judged CBAs particularly effective as "extension" tasks for gifted and talented students (T1). Several teachers noted that CBAs allowed "naturally inclined" students to explore topics in greater depth and complexity, keeping them challenged and engaged. Another teacher remarked, "CBAs can provide opportunities for students to extend their learning beyond the standard curriculum" (T5). This aligns with literature on the benefits of providing challenging, PBL-style tasks to gifted students (Bell, 2010; Chen and Yang, 2019). Andreas

Schleicher at the OECD also highlights the necessity of "assessments that demonstrate how learners can apply knowledge dynamically", advocating for teaching conceptual understanding and practical application of knowledge (O'Brien, 2024).

5.2.2 Promoting Reflective Practices to Foster HOTS

Reflection is considered a central component of CBAs, allowing students to connect their projects to their own experiences, which may deepen understanding. This is consistent with Dewey's philosophy of experiential learning, which advocates for reflective thinking to enhance learning (Dewey, 1938; Rodgers, 2002). Teachers interviewed unanimously judged that reflection helps students "internalise their learning experiences" and understand their progress, which some literature deemed essential for developing HOTS (Dewey, 1933; Schön, 2017).

Music and Art teachers particularly highlighted the role of continuous reflection and questioning as vital to students' project work and their learning process, linking these practices with critical thinking, evaluation, and application. This aligns with Schön's (1983) concept of reflective practice, which highlights the role of ongoing reflection in professional growth and learning. Research indicates that such critical reflection is essential for developing HOTS as it encourages students to engage deeply with their learning outcomes and fosters a growth mindset (Hattie, 2012).

5.2.3 Misalignment with Curriculum

Despite the positive aspects, some teachers observed that the development of HOTS through CBAs is not always consistent. An English teacher (T1) suggested that while CBAs have the potential to nurture HOTS, their effectiveness may vary depending on the students' initial abilities or the style of teacher facilitation. A History teacher (T2) saw potential in CBAs to foster HOTS but highlighted the significant pressure of covering the existing curriculum, noting insufficient time to properly address both CBAs while keeping up with course content. This placed considerable stress on both teachers and students.

A Maths teacher highlighted the significant gap between Primary and First Year Maths, noting students struggle with CBAs due to curriculum misalignment (T3). Maths teachers observed students "students not being up to par" for Maths CBA 1 and often lacking the "foundational

skills" needed for HOTS. In response, they implemented early preparation to "sow the seeds" to align the curriculum with CBA practices. Actions taken included introducing "mini-CBAs" in First Year, together with creating a "classroom culture" featuring student-centred practices and group work (T1, T2, T3, T5).

Teachers noted that subjects like Art and Music "naturally" incorporate PBL, effectively fostering HOTS due to these subjects' creative and reflective nature (T2, T4). Such subjects could effectively model integrating HOTS into traditionally teacher-led subjects like Maths. Encouraging collaboration between teachers of different disciplines could help share best practices and strategies for fostering HOTS, ensuring a more cohesive approach across curricula.

5.3 Challenges to Implementation

5.3.1 Logistical and Resource-Based Challenges

Logistical issues including lack of resources and large class sizes present significant challenges to effective CBA implementation, as highlighted by English and History teachers in this study. These challenges are consistent with literature noting the difficulties in implementing new assessment practices without adequate support and training (Darmody et al., 2020; McGarr et al., 2023). One teacher pointed out that managing CBAs in large classes presents challenges in providing each student with adequate feedback and support (T2). However, a Maths teacher found that group work on CBA projects effectively mitigated the problem of large class sizes (T5), aligning with Hattie's (2009) findings on the impact of class size on individualised feedback and effective learning.

5.3.2 Teacher Training and Professional Development

The findings indicate a lack of adequate teacher training and PD to facilitate effective CBAs. Art teacher (T4) reported numerous conversations with colleagues across disciplines who complained of feeling unprepared to facilitate CBAs. Experienced in facilitating project work, T4 was dismayed by colleagues reporting of their teacher-led CBA implementation rather than a more facilitative, student-centred approach. Another teacher acknowledged, "Teachers sometimes want to help too much" (T5). It should be noted that the latter teacher, while initially resistant to CBAs, changed her mind following targeted training on CBA implementation. This aligns with the literature, which stresses the importance of CPD to equip teachers with the necessary skills to implement new assessment methods effectively (Darmody et al., 2020; Gleeson, 2021; Kirk,

2018).

5.3.3 Scheduling and Project Fatigue

Another prevalent issue is the concurrent scheduling of CBAs across multiple subjects. Teachers reported block-scheduling across subjects as leading to "project fatigue" among students (T5). When students are required to complete several CBAs simultaneously, it could diminish their overall investment and engagement (T2, T5). This finding aligns with literature suggesting that students across schools reported experiencing significant stress with regard to their everyday workloads as they struggled to balance homework, CBAs, and study for tests and exams (McGarr et al., 2023).

5.3.4 Standardisation and Coordination

Teachers observed a lack of standardisation in CBA implementation across schools and nationally, causing "discrepancies in how CBAs are implemented and assessed" (T4). This inconsistency could undermine the fairness of the assessment process. Additionally, the need for coordinators was highlighted for "coherent CBA implementation across departments and schools" (T1, T2, T4). The Art teacher (T4) believes a "disconnect" between the NCCA and the SEC complicates standardisation. Greater coordination between these bodies could be key to consistent, effective CBA implementation (Gleeson, 2023; Mulcahy & Murphy, 2022).

5.3.6 Challenges for SEN Students

Teachers suggest that the implementation of CBAs poses particular challenges for students with SEN. One teacher highlighted that "SEN students can be easily overwhelmed by the number of CBAs scheduled" (T2). A lack of SEN-tailored support during CBA implementation often leads to increased anxiety and reduced performance. According to the JCT recommendations, special provisions should be made for SEN students to mitigate the impact of disabilities (JCT, 2023). However, SEN Coordinator (T2) judged the provisions not always adequate in fully supporting SEN students' undertaking CBAs.

Commented [MC1]: If this is not found in the literature elsewhere, ensure to bring it up in the conclusions chapter as a recommendation.

5.3.7 The Hybrid Curriculum

The transition from primary to secondary school revealed a gap in student readiness for CBAs, particularly in Maths. T3 noted, "Students need to derive a formula for Maths CBA 1 requiring

knowledge not covered". She labelled it an "inappropriate" level of difficulty, adding, "Teachers have lowered their expectations regarding CBAs". This gap is exacerbated by the hybrid curriculum: the coexistence of formative assessments and a high-stakes exam culture. T4 insisted, "the high-stakes exam still trounces all other assessments".

Conflating CBA "descriptors" with percentage grades added confusion and stress (T1, T2, T4, T5). CBA descriptors are documented on the Junior Cycle Profile of Achievement (JCPA), not a percentage mark (DES, 2015). McGarr et al. (2023) observed students questioning the value of CBAs and the additional workload. Most teachers addressed these issues by clearly explaining the real-world value of CBAs, focusing on the learning journey and personal achievement.
These challenges highlight the broader issue of balancing formative and summative assessments (Gleeson, 2010; Murchan, 2021). Teachers agreed that when CBAs are not seen as valuable learning experiences, their potential to foster HOTS is significantly reduced. This finding aligns with Nicol and Macfarlane-Dick (2006), who argue that the perceived relevance of assessments greatly impacts student engagement and learning outcomes.

5.4 Opportunities in Implementation

5.4.1 Enhanced Collaboration and Pre-Planning

Teachers agreed that opportunities for improvement should include enhanced teacher collaboration and pre-planning. One teacher called the SLAR "a valuable collaborative experience" (T2). This aligns with best practices advocating collaborative approaches to curriculum planning and assessment (MacPhail et al., 2018). McGarr et al. (2023) also found that collaborative efforts can mitigate challenges in implementing new educational reforms, ensuring consistency and shared understanding among staff.

5.4.2 Integration into the Learning Continuum

Integrating CBAs into the overall curriculum rather than treating them as isolated events was highlighted by several teachers as a key opportunity. This aligns with Dewey's philosophy of experiential learning, promoting deeper engagement and understanding through integrated assessments (Dewey, 1938; Girvan et al., 2016; Rodgers, 2002). Almost all teachers advocated the early "embedding" of CBA elements into daily teaching, ensuring students see them as a natural part of their education. Gleeson (2022) supports this, suggesting that integrating formative

assessments enhances their relevance and effectiveness. Addressing these issues could better align CBAs with the curriculum to maximize their potential to foster HOTS.

5.4.3 Fostering Independent Learning

CBAs can foster independent learning by encouraging students to "take ownership" of their educational journeys. T1 noted, "CBAs encourage students to think independently and manage their own projects". This aligns with literature suggesting that PBL and student-centred learning enhance motivation and engagement (Bell, 2010; Hmelo-Silver, 2004). T2 observed CBAs supporting "self-directed learning", where students plan and execute projects with minimal guidance. By promoting independent learning, CBAs help students develop self-discipline, critical thinking, and effective time management. This supports the Junior Cycle Framework's emphasis on key skills to prepare students for the complexities of the modern world (DES, 2015).

5.5 Inclusiveness and Gender Dynamics

5.5.1 Support for SEN Students

CBAs were found to support inclusiveness by accommodating diverse learning needs. One teacher remarked, "CBAs offer alternative ways for SEN students to showcase their knowledge" (T5). This aligns with literature highlighting the role of FA in accommodating diverse student needs (Black & Wiliam, 1998). By encouraging student choice on topics, CBAs allow for a learning experience that can cater to individual strengths and weaknesses (Darmody et al., 2020).

5.5.2 Gender Dynamics and Confidence Issues

The findings revealed meaningful gender dynamics, particularly self-doubt and perfectionism among female STEM students. Maths teachers noted that girls often experience higher anxiety and risk avoidance, potentially hindering their engagement with CBAs. These behaviours reflect broader issues of stereotyping and gender bias in education (Cheryan et al., 2015).
Stereotyping, which suggests boys are naturally better at Maths and Science, can affect girls' confidence and willingness to engage with these subjects (Cvencek et al., 2011). For instance, T3 mentioned that girls often "second-guess themselves and strive for perfection, which can be paralysing". This is supported by studies showing girls are more likely to experience self-doubt and fear of failure in STEM (Smyth, 2015).

5.5.3 Encouraging Confidence in Mathematics and Science

One Maths teacher mitigates confidence issues by creating "a classroom culture" that supports risk-taking and values the learning process over "perfect" results. The same teacher observed that CBAs could help build confidence by leveraging "positive reinforcement" through teacher facilitation and group work (T5). Smyth (2015) indicates that viewing mistakes as learning opportunities can significantly enhance confidence and engagement in subjects like Mathematics.

5.6 Conclusion

This chapter has critically analysed the findings of this study in relation to existing literature and the research questions. The data provide valuable insights into the role of CBAs in fostering HOTS and the challenges and opportunities associated with their implementation in an all-girls school. The findings highlight the need for better integration of CBAs across subject curricula, ongoing PD for teachers, and targeted support for female students in STEM subjects. These insights contribute to the broader discourse on educational reform and the implementation of FA in the Junior Cycle framework. Chapter Six will present the main conclusions from this study, discussing implications for policy, practice, and future research.

Chapter 6: Conclusion

6.1 Introduction

This study sought to explore the role of CBAs in fostering HOTS in an all-girls school, driven by my direct experience within the Irish educational system. This research has revealed that CBAs have the potential to effectively foster HOTS for all students, with particularly positive outcomes for high-achieving students. However, there remain substantial challenges for effective implementation related to curriculum alignment, gender dynamics, and logistical issues. This chapter synthesises these key findings and offers recommendations for future research, policy and practice.

6.2 Main Conclusions

6.2.1 Potential of CBAs to Foster HOTS

This study posits that CBAs have largely demonstrated a significant potential to foster HOTS, including critical thinking, problem-solving, and reflective practices. These outcomes are consistent with the educational goals outlined in the literature, emphasising the development of advanced cognitive skills necessary for the 21st century (Anderson and Krathwohl, 2001; Brookhart, 2010). The study reveals that CBAs are particularly effective in extending HOTS in gifted students. However, the comprehensive effectiveness of CBAs is contingent upon their seamless integration into the curriculum, adequate teacher training, and logistical support.

6.2.2 Challenges in Implementation

CBA implementation is fraught with challenges, including logistical issues, lack of standardisation, and insufficient teacher training. These obstacles may hinder the full realisation of CBAs' potential. Consistent with recent research (Darmody et al., 2020; Gleeson, 2021), this study found that large class sizes and limited resources were observed to constrain teachers' ability to provide individualised feedback, a critical component of FA (Hattie, 2007).

6.2.3. Gender Dynamics and Inclusivity

The study revealed marked gender dynamics, particularly the higher levels of self-doubt and perfectionism among female students in STEM subjects. This finding aligns with existing research on gender disparities, highlighting the need for targeted support to build confidence and

engagement in female students (OECD, 2023). Additionally, the need for inclusive practices that cater to diverse learning needs was exposed, highlighting the importance of tailored support for SEN students (Black & Wiliam, 1998; Black, 2015).

6.2.4. Importance of CPD

CPD emerged as key for the successful implementation of CBAs. Teachers require continuous training to adapt to new assessment methodologies and to facilitate FA effectively (Sato, Wei and Darling-Hammond, 2008). This should involve clear guidelines on appropriate facilitation to emphasise the inherent value of CBAs as non-graded FA promoting student development, achievement and real-world relevance.

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6.3 Limitations of the Study

6.3.1 Methodological Limitations:

Sample Size and Scope: The study's focus on a single all-girls school limits the transferability of findings. The sample comprised teachers from the same school, which further restricts the diversity of perspectives. Future research should include a more diverse range of schools and teachers and capture a broader spectrum of experiences to provide a more representative understanding of the Irish school context.

6.3.2 Qualitative Data: The reliance on qualitative data, while providing in-depth insights, may not fully represent the broader trends across different educational contexts. Opinions gathered through interviews, while valuable, may be subjective and less reliable in portraying widespread trends (Lewis, et al., 2003). Incorporating quantitative measures in future studies from a larger sample that more accurately represents the student cohort in Ireland could enhance the consistency of findings (McKim, 2017).

6.3.3 Overall Project Limitations:

Implementation Variability: Variability in the implementation of CBAs across different classrooms and subjects posed a challenge in assessing their uniform impact. Nationally standardised implementation guidelines could help mitigate this issue. CBA coordinators in schools could monitor implementation to provide a clear framework for teachers, ensuring more coherent and equitable assessment practices across schools. This would enhance the validity of CBAs and

ensure that their intended educational outcomes are achieved uniformly.

6.3.4 Teacher Bias: Teachers' preconceived notions and resistance to change could have influenced the implementation and outcomes of CBAs, highlighting the need for strategies to address such biases.

6.4 Recommendations

6.4.1 Policy-Based Recommendation:

Standardisation of CBA implementation within the "hybrid curriculum": Develop clear national guidelines and appoint coordinators to ensure standardised implementation of CBAs across schools. It is advisable to refine the broad assessment range of CBA descriptors to more accurately reflect student achievement and enhance students' perceived value of the CBAs. This would promote consistency and fairness in FA practices, addressing the variability issues identified in the study (Murchan, 2021).

6.4.2 Practical Recommendation:

CPD for teachers: Invest in comprehensive PD programmes focusing on FA and PBL techniques. These programmes should be ongoing and include practical workshops, peer collaboration opportunities, and resources to support teachers in integrating CBAs effectively into teaching practice.

6.4.3 Methodological Recommendation:

Mixed-Methods Approach: Future research should employ a mixed-methods approach, combining qualitative and quantitative data to provide a more comprehensive understanding of CBAs' impact. This would address the limitations of relying solely on qualitative data and enhance the generalisability of the findings.

6.5 Conclusion

This study underlines the potential of CBAs to foster HOTS in an all-girls school, noting both the benefits and challenges of their implementation. The findings suggest that while CBAs can significantly enhance critical thinking and independent learning, their success depends on addressing logistical challenges, standardising implementation, and providing CPD for teachers.

The gender dynamics observed stress the need for targeted interventions to support female students, particularly in STEM. Additionally, the study found that CBAs are effective in extending HOTS in high-achieving students, addressing a gap noted by Andreas Schleicher who criticises the Irish education system for not adequately catering to these students (O'Brien, 2024). By addressing these challenges and implementing the recommendations provided, educators and policymakers can enhance the effectiveness of CBAs, creating a more inclusive, equitable, and effective educational environment.

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Appendices

Appendix A: Research Information Sheet and Consent form for teachers:

Research Information Sheet	
Researcher:	[redacted]
Organisation: **(name and contact details)**	Hibernia College Dublin
Title of study:	Examining Teacher Implementation of Classroom-Based Assessment for fostering Critical Thinking, Creativity, and Inclusiveness in an All-Girls School.

Outline of research study:

In the ever-evolving landscape of education, a paradigm shift towards holistic student development has led to the integration of innovative assessment practices. At the forefront of this transformation are Classroom-Based Assessments (CBAs), a dynamic approach designed to align with the principles of formative assessment, experiential learning, project-based learning, and the overarching goals set forth by the *Framework for the Junior Cycle* (DES, 2015).

CBAs represent a departure from traditional summative assessment methods, marking a pivotal shift towards a formative assessment model. Embedded within the ethos of CBAs is a commitment to experiential learning. By engaging students in student-led, hands-on, practical experiences, CBAs transcend the confines of conventional assessments, encouraging learners to apply theoretical knowledge to real-world scenarios. It is posited that this experiential dimension not only enhances comprehension but also nurtures creativity, critical thinking, and problem-solving skills. Through CBAs, students are empowered to embark on multifaceted projects that demand collaboration, creativity, and application of knowledge – skills integral to success in the project-centric professional landscape of the 21st-century. Additionally, CBAs provide opportunities for students to reflect on their learning experiences, fostering a metacognitive approach that enhances their understanding and self-awareness.

In essence, CBAs emerge as a linchpin in the educational landscape, intertwining the principles of formative assessment, experiential learning, project-based learning, and the ambitious goals set forth by the *Framework for the Junior Cycle*. As education continues to evolve, CBAs stand at the forefront, embodying a commitment to a more comprehensive and student-centric approach to learning and assessment.

This research aims to investigate how teachers implement CBAs to address diverse learning needs and promote inclusiveness in the context of a high-achieving all-girls school. The study will explore the strategies teachers use to align CBAs with different learning needs, together with higher-order thinking skills on Bloom's Taxonomy.

Objectives of the project:

The objectives of this research are to investigate how teachers implement project-based assessments, specifically CBAs, in an all-girls school to cater to diverse learning needs. This research will explore the strategies employed by teachers to align CBAs with higher-order thinking skills on Bloom's Taxonomy (analysing, evaluating, creating) and examine the

role of CBAs in promoting inclusiveness within the context of an all-girls school.

What would I need you to do?

Your participation in this research project is greatly appreciated. This research project has received ethical approval from Hibernia College Dublin. If you agree to participate, you will participate in a short semi-structured interview with the researcher on implementing project-based assessments, with a specific focus on CBAs, and how these practices cater to diverse learning needs. The interview will be approximately 20-30 minutes in duration. Any information you provide about your own identity or that of the school will be anonymous and confidential. Quotes from the interview may be used and may also be published in the research. However, your name and the name of the school will not published. The interview will be audio recorded and transcribed, and a copy of the transcript will be made available to you on request. This research will be used in a publication of a thesis for Hibernia College Dublin. It may also be used in conference proceedings or used in academic articles. You are free to withdraw from the study at any time.

What is the purpose of this research?

The purpose of the research is to complete small-scale study which forms part of the final year of the Professional Masters of Education (Post Primary) with Hibernia College Dublin.

Consent Form	
Researcher's name:	[redacted]
Organisation:	Hibernia College Dublin
Title of study:	Examining Teacher Implementation of Classroom-Based Assessment for fostering Critical Thinking, Creativity, and Inclusiveness in an All-Girls School.

Consent (to be completed by the participant)

Have you been fully informed/read the information sheet about this study?

Yes/No Have you had an opportunity to ask questions and discuss this study?

Yes/No Have you received satisfactory answers to all your questions?

Yes/No

Do you understand that you are free to withdraw from this study at any time without giving a reason for withdrawing and without your withdrawal having an adverse effect for you? Yes/No

Do you agree to take part in this study, the results of which are likely to be published or presented at a conference? Yes/No

Have you been informed that a copy of this consent form will be kept by the researcher? Yes/No

Are you satisfied that any information you give to the researcher will be kept confidential? Your name and the name of the school will not appear in the research report. Yes/No

Participant's name (printed)

(signature) [redacted]

Date 07.04.24

Researcher's signature [redacted]

Date 07.04.24

Appendix B – Pilot and revised interview questionnaires

Revised Interview Questions with Original and Adaptations:

Introduction and Background:

- Original: Can you share your general understanding of the role of Classroom-Based Assessments (CBAs) in the Junior Cycle?
    - Adaptation: Could you describe how CBAs have influenced your approach to teaching and assessing students within the Junior Cycle?
- Original: How familiar are you with the implementation of CBAs in the Irish education system?
    - Adaptation: In your experience, how has the implementation of CBAs evolved since their introduction?

Implementation of CBAs:

- Original: From your perspective, how have CBAs been implemented in the Junior Cycle? Can you provide examples?
    - Adaptation: Could you detail the ways in which CBAs have been integrated into the curriculum at your school? Could you provide specific examples?
- Original: What strategies are being used to facilitate the implementation of CBAs in schools?
    - Adaptation: What strategies have proven effective in facilitating the implementation of CBAs at your school?

Alignment with Higher-Order Thinking Skills:

- Original: In your opinion, do CBAs align with the development of higher-order thinking skills among students? How so?
    - Adaptation: In what specific ways do you believe CBAs support the development of higher-order thinking skills among students?
- Original: Can you discuss any specific instances where you've observed CBAs fostering skills like analysis, evaluation, or creativity?

Exploring Gender Disparities and Performance:

- Original: In your experience, how do CBAs address gender disparities in performance, especially in subjects like mathematics and science?
    - Adaptation: How do CBAs address gender disparities in performance, particularly in subjects like mathematics and science, from your observation?
- Original: What observations have you made regarding the impact of CBAs on female students' self-belief and confidence in traditionally male-dominated subjects?
    - Adaptation: What impact have you observed from CBAs on female students' confidence and self-belief in traditionally male-dominated subjects?

Inclusiveness in an All-Girls School:

- Original: How do CBAs cater to diverse learning needs, cultural backgrounds, and gender inclusivity, particularly in an all-girls school setting?
    - Adaptation: How are CBAs tailored to cater to the diverse learning needs and cultural backgrounds of students in an all-girls school setting?
- Original: Are there specific aspects of CBAs that you find particularly effective or challenging in promoting inclusiveness?
    - Adaptation: What aspects of CBAs do you find most challenging or effective in promoting inclusiveness?

Challenges and Benefits:

- Original: What benefits have you observed from the implementation of CBAs in the Junior Cycle?
    - Adaptation: What benefits have CBAs brought to the learning environment in the Junior Cycle at your school?
- Original: Can you describe some of the challenges faced during the implementation of CBAs?
    - Adaptation: Could you discuss some of the main challenges you have faced during the implementation of CBAs?

Reflection and Autonomy:

- Original: Is student self-reflection a formal part of CBAs? Can you elaborate on its role and impact?
    - Adaptation: Is student self-reflection an integral part of CBAs at your school? How does it impact student learning?

Appendix C-Table for colour coding themes and sample coded interview transcript

Fostering HOTS : GREEN **26**
Encourages learners to think outside the box
Promotes student reflection and connection to topics
Continuous engagement and feedback promoting HOTS
Integration of CBA-related activities into daily learning routines
Autonomy in topic selection empowering students and enhancing engagement
Reflection contributing to higher order thinking with targeted questions
HOTS not fostered by CBAs, if not implemented correctly : RED 2
Challenges to Implementation : 18
Impact of COVID-19 on teaching practices and CBA implementation
Resource allocation and logistical planning impacting CBA execution
Coordination challenges within schools affecting consistency
Variability in implementation standards across different settings
Challenges in fostering HOTS due to large class sizes or insufficient interaction
Opportunities of Implementation : PINK 4
Departmental collaboration and pre-planning essential for seamless CBA integration
Use of diverse instructional strategies to cater to different learning needs
CBAs as tools for expressing diverse cultural and personal identities
Specific strategies to support students with special educational needs (SEN)
Promoting inclusivity through student-led topic choices reflecting interests, culture, backgrounds
Peer learning in CBAs helps learners gain confidence
Need for CBAs to be integrated as a natural part of the learning continuum, not isolated assessments
Reflection on educational practices and continuous curriculum adjustments necessary

subjects not in art have turned them into an exam and they are sort of pre-empting them, and they're prepping them and they're doing them once, twice, three times, and it's creating this really bad sort of anxiety amongst kids and it's not actually fulfilling the objective that they were there for whereas with art, for us, it's just another normal project. So Cbas are very different I suppose for other subjects because teachers are getting anxious about them. But for art, it's exactly the same as we do every project. So we do an art 6 to 8 week projects. They always sort of follow a thing of, you know, a process of, you know, a starting point, be it a theme or whatever like that, then research around that observation through drawing or other medium process, then reflection on that. So there's loads of critical thinking elements within art naturally, and then from that they go on and design and realise. So for us it totally fits in critical thinking, but no more than any other project and that's what actually... when the NCCA were developing these, they wanted, so it should be just a normal project. It should be a check in, but unfortunately nationally in other areas, that's not happening. But in art, it definitely is.

Speaker 2

And how do you know that that's not happening? Is that from discussions with colleagues or have you observed?

Speaker 1

With colleagues, observed with students and from hearing all the things that we're trying, this once practise this and also the way they're presenting it, it's overly formal and also the way the kids talk about it in terms of the grading, you know, I mean it's not shouldn't be graded. It's a one point checking without a grading and there's a complete misunderstanding from teachers more than students. Yeah, it's a check in descriptor to say this kid is is where they should be, not