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Author(s)	O'Mahoney, Kathleen;Heinz, Manuela
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USING COMMENT ONLY MARKING IN A MATHEMATICS CLASSROOM IN THE REPUBLIC OF IRELAND: EXPERIENCE AND LEARNING OF A STUDENT TEACHER

Kathleen O' Mahoney and Manuela Heinz¹

National University of Ireland Galway

Formative assessment is a well recognised and researched method of assessing student learning and understanding in the classroom. One method of formative assessment is the use of comment only marking. In this paper, a Bachelor in Mathematics and Education student investigates the use of comment only marking and how it is received in the maths classroom of a senior cycle class in Irish second level education. Comment only marking aims to provide clear goals for students that are linked to assessment criteria, thus encouraging independent learning and self-assessment. Findings show that Irish second-level students' attitudes in relation to comment only marking changed over the duration of the project. Differences were also apparent as regards the perceptions and experiences of students of different abilities.

KEYWORDS

Formative assessment, comment only marking, second-level mathematics education, assessment criteria, action research

FOREWORD - CONTEXT AND WIDER IMPACT OF THIS ACTION RESEARCH PROJECT

This action research project was conducted by a student teacher studying on the Bachelor in Mathematics and Education (BME) at the National University of Ireland Galway (NUI Galway). In her study, Kate was supported by her university supervisor with whom she had various meetings throughout the project's planning, implementation, analysis, interpretation and write-up stages. Kate's project was highly innovative in the Irish second-level school

¹ Corresponding author: manuela.heinz@nuigalway.ie

context which places heavy emphasis on external summative assessment. Her findings have not only influenced her own attitude towards assessment but also those of many student teachers who followed her in the School of Education at NUI Galway. Kate's action research supervisor, who is also a lecturer on various undergraduate and postgraduate teacher education programmes, is now regularly sharing findings from this study with student and practicing teachers and feels that the relevance of this Irish study has led to an increased interest in and implementation of comment only marking among (student) teachers at her institution.

INTRODUCTION

Comment only marking is a method of formative assessment. It involves the teacher giving constructive feedback and linked goals in order to encourage and motivate the students to promote their independent mathematical thinking and develop self-assessment skills. Assessment is seen as a key learning strategy in the classroom. Black and Wiliam (1998) refer to assessment as all the actions undertaken by teachers and students to self-assess their learning. As a result, Black and Wiliam (1998) suggest that information provided by this self-assessment can be used as feedback to influence and modify teaching and learning activities. According to Petty (2009), different forms of assessment can be used to motivate and encourage the learner while also improving and enhancing their work. There are two main forms of assessment, summative assessment and formative assessment.

Summative assessments are given periodically to determine a student's understanding of the topic at a particular point in time in relation to content standards. It can also be referred to as assessment of learning. According to Garrison and Ehringaus (2007), summative assessment occurs too far down the student's learning path for them to make instructional adjustments during the learning process.

Formative assessment occurs when the results of assessment are considered and used to alter the teaching to meet the students' needs almost instantly. It is also known as assessment for learning (Black and William, 1998). Formative assessment is both useful for students and teachers. It provides feedback for teachers on the effectiveness of their teaching strategies and approaches, which they can then adjust to improve student learning. Secondly, formative assessment can be useful for students in that the feedback is focused and precise so they have the ability to identify specific areas that need work and whether they need to adjust their way of thinking (Phelan et al., 2011). To provide an ample basis for formative assessment, three processes are central: establishing where students are in their learning, establishing where they are going and establishing how to help them get there (Wiliam and Thompson 2007).

There has been a very heavy emphasis on external summative assessment in Ireland and the Leaving Certificate² has been found to have a backwash effect on school curriculum, on internal assessment practices and on pedagogy at second level in general (Coolahan, 2003; NCCA, 2003). Accordingly, research and evaluations of the examination system have shown that classroom practice tends to have a strong focus on exam preparation rather than exploratory and independent learning (NCCA, 2011).

The need for reform can be seen throughout the Irish Curriculum, particularly with Mathematics. The introduction of Project Maths, a new Maths syllabus for second-level schools in Ireland, aims to provide a heightened student learning experience and improved levels of engagement and achievement overall. More emphasis is placed on student understanding of mathematical concepts, rather than the previous practice of rote learning. There is an increased use of contexts and applications which enables students to relate mathematics to everyday experience (Junior Certificate Mathematics Syllabus, 2012). This change in curriculum supports the increased use of formative assessment in classrooms. The variety of activities that learners engage in encourages them to take charge of their own learning by setting goals and objectives, developing action plans and receiving and responding to assessment feedback. The new approach to Mathematics teaching promotes the use of a wide range of learning, teaching and assessment approaches including investigations, class tests and reports (Junior Certificate Mathematics Syllabus, 2012).

The introduction of Project Maths indicates a significant shift from a summative assessment culture to a more integrated approach of summative and formative assessment. Comment only marking is a formative assessment method. This action research project explores the impact as well as students' attitudes towards and experiences with comment only marking in an Irish second-level maths classroom.

LITERATURE REVIEW

According to research conducted by the National Centre for Curriculum and Assessment (NCCA, 2005), key qualities of formative assessment are: sharing and clarifying the learning intention and criteria for success with learners; the use of questioning to support learning; the quality of feedback; student self-assessment; and peer assessment.

The NCCA (2005) conducted a study on formative assessment which involved sixteen schools and ninety-six teachers. The teachers viewed the large content-based curriculum and time constraints as working against exploratory approaches to teaching and learning. The study also found that for formative assessment to be successfully implemented, whole school involvement is required. Many teachers were in favour of formative assessment strategies but

² The Leaving Certificate is the terminal public examination in Ireland assessing students' performance at the end of their second-level education. It is used by higher education institutions for the purposes of selection of students onto undergraduate courses. Students' grades on the Leaving Certificate Examination are converted to 'points' for the purpose of selection.

believed that their comments on student work were only valued by students when backed up with a solid grade.

For the implementation of formative assessment to be successful it appears that sharing the learning intention and criteria for success in the classroom is essential. Frederiksen and White's (1997) study on sharing the criteria for success found that the mean score of students in a reflective assessment group (where students were aware of the criteria for success) was higher when compared with the control group. The study also found that the difference in achievement was much greater between students with weaker basic skills who received the criteria for success, compared to students with weaker basic skills who did not receive the criteria for success.

Feedback is seen as a primary component of formative assessment and one of the factors that have the strongest influence on learning (Black and William, 1998; Crooks, 1988, Hattie and Timperley, 2007; Hattie, 2009). For feedback to be effective and connected, students need to share their teacher's view of assessment goals and criteria (Nicol & Macfarlane-Dick, 2006).

Feedback has been shown to benefit learners only when it gives students precise assistance on realising the strengths and weaknesses of their work (Black and William, 1998). A method encouraged by Petty (2009) is to provide 'medals' (what students did well), 'missions' (what needs to be improved) and 'clear goals'. The medals and missions provided should be linked to the clear goals. Nicol and Macfarlane-Dick (2006) support this approach and define good feedback practice as comments that strengthen and encourage students to self-regulate their own performance.

In Butler's (1988) study, students who received comment only feedback increased their performance scores while the performance of groups of students who received 'grade only' marking and 'comment and grade' marking did not improve in the same way. Tests of students' interests showed a similar pattern. Grades (with or without comments) undermined the interest/attitudes of low achieving students while high achievers in all three groups remained at a level of high interest. This supports the view that an explicit focus on grade attainment can lower the quality of task performance (Black and William, 2006).

In the study by the NCCA (2005), teachers found comment only marking to be a motivational incentive and a way of encouraging students to self-assess their own work. It aided the teacher in that it provided them with a more rounded profile of the student, which they found useful when it came to reporting to parents. An interesting finding from this study was that comment only marking was sometimes challenged by high achieving students who demanded to know how they had done in reference to a grade or mark (NCCA, 2005).

Task-involving assessment is proven to be much more beneficial than ego-involving assessment (Black and William, 2006). One of Nicol and Macfarlane-Dick's (2006) seven principles of good feedback practice is that it should clearly identify what good performance

is (goals, criteria, and expected standards). Incorrect views of goals and criteria not only affect how the students perform but also how they perceive feedback. It is important to note that effective feedback not only guides students towards academic goals, but, over time, helps clarify what these goals are. Through feedback, teachers are encouraging students to gradually develop self-assessment skills to aid in reaching their academic goals (Nicol and Macfarlane-Dick, 2006).

The benefits of formative assessment are clear. It is beneficial to both teacher and student in that it helps a teacher gauge the level of understanding of their class and the way in which they need to adjust their instruction to determine the next steps in the learning process. Providing personal feedback (comment only marking), allows a teacher to get a better insight into each individual student's strengths and weaknesses. It is vital this feedback relates back to the original goals and criteria for success set out at the beginning of the topic. Students are empowered to bridge the gap between what they do not know and what they are required to know by understanding the comments that the teacher provides and, through reflection, they are empowered to connect their own progress and performance with the original goals and criteria.

METHODOLOGY

Twenty-seven participants in total took part in this study. All participants were studying mathematics in the first year of the Leaving Certificate cycle. A mixed-methods approach was adopted, using both quantitative and qualitative methods.

The participants completed a questionnaire exploring their experiences with and thoughts about different feedback methods. They then received comment only marking on four tests over a five week period and, subsequently, completed a second questionnaire exploring their experiences with and thoughts on comment only marking. Comments were given to students using the 'Medals, Missions and Goals' method (Petty, 2009). Comments were linked to the students' individual work and teachers shared their views of the assessment goals and criteria. They focused on strengthening and encouraging students to self-regulate their own performance.

The questionnaire was developed and pre-tested with the researchers' supervisor and her cooperating teachers which led to a number of the questions being revised and a slight alteration to the sequence of the questions. Microsoft Excel spreadsheets were used to analyse the categorical items from both questionnaires. The categorical closed questions were analysed using frequency tests to ascertain and compare the percentages of students who welcomed (or not) and who recognised (or not) benefits of comments only marking before and again after the intervention. The open question responses from the questionnaires were transcribed into Microsoft Word and analysed thematically by grouping same or similar responses together.

Semi-structured interviews were conducted with six students, selected at random, to uncover the ‘what’ and ‘how’ of the research area and to encourage diverse and more in-depth responses and explanations. The semi-structured method was chosen as it allowed the interviewer to probe for further information and/or to expand on the unforeseen. The questionnaire questions were used as template for the interviews. All interviews were transcribed into Microsoft Word and, again, analysed thematically in order to establish common themes in students’ descriptions and/or explanations of their preferences regarding feedback. Similar responses were grouped together and quotes have been selected and are presented in the findings section to represent the main themes established in the analysis.

Before commencing the study, the purpose and topic of the research was outlined to the participants. The voluntary nature of participation and the right to withdraw partially or completely from the process was explained and pupil and parental assent and consent to participate in the study was obtained. Participants were also provided with information about data storage and usage and the various means of dissemination of research findings. At all times the researcher sought not to cause embarrassment, stress, or discomfort to the participants arising from their involvement in the research.

Some of the limitations of this study were time and budget constraints. As such, the study was restricted to one 3 months school placement and one class group.

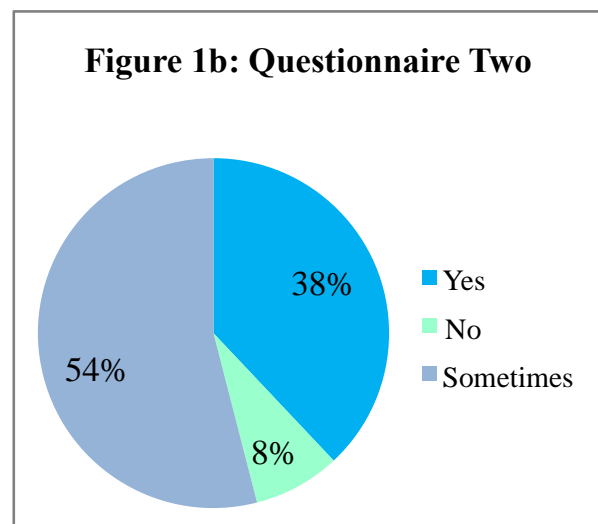
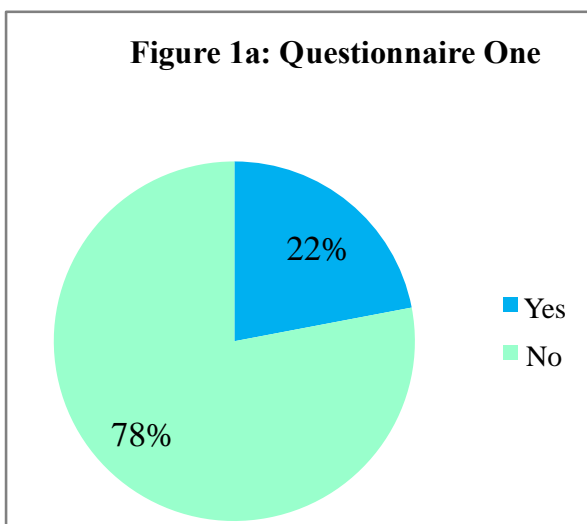
FINDINGS

Students’ openness towards and perceptions of comments only marking before and after the intervention

Students reported their attitudes towards and experiences with feedback in two questionnaires, one before receiving comment only marking (Questionnaire One) and one after (Questionnaire Two).

Figures 1 and 2 illustrate a clear change in students’ attitudes towards comment only marking with 78% of students rejecting this feedback method completely in questionnaire 1 compared to only 8% of respondents in questionnaire 2.

Figures 1a and 1b: Students were asked “Would you like to receive comments instead of grades on your work?”



Figures 2a and b show that students might be less sure about the most beneficial feedback method after the intervention, with the percentage of students making no judgment rising from 8% in the first to 17% in the second questionnaire and the percentage of those who are sure that comments together with grades are the best method falling from 63% to 54%.

Figures 2a and 2b: Students were asked “What method of feedback do you think would be most beneficial to improve your work?”

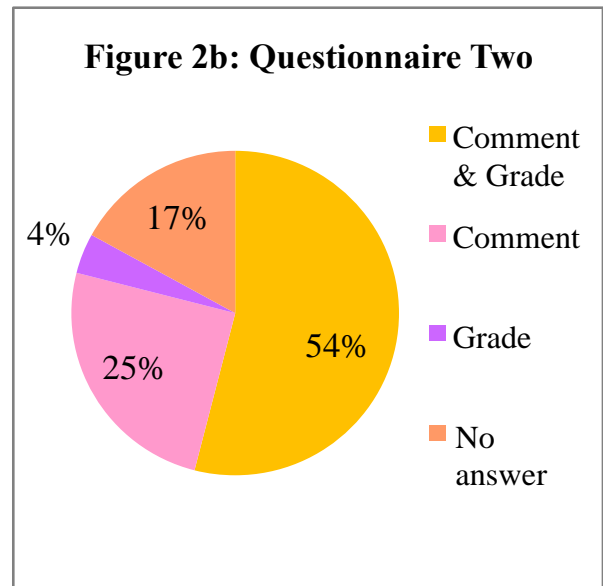
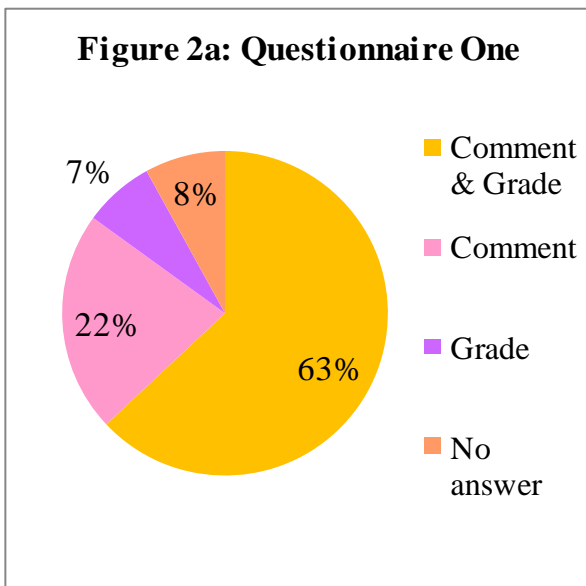
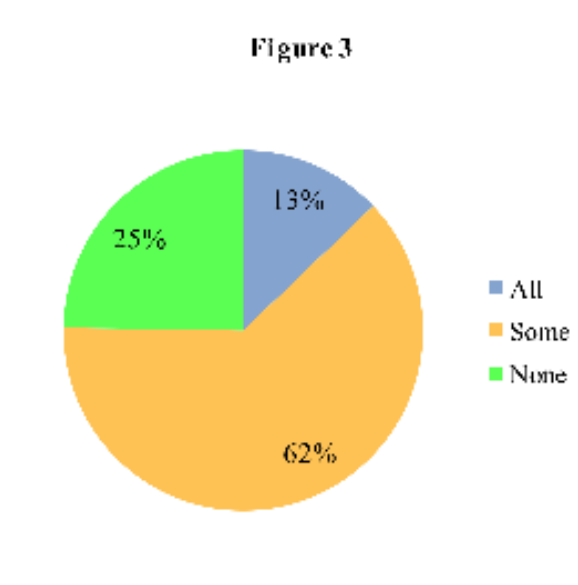


Figure 3: Students were asked “Would you like all, some or none of your subjects/tests/homework to be only comment only marked?”



When asked “If you receive a comment, do you find it useful to improve your work?”, typical responses given in questionnaire 1 (before the intervention) were as follows:

No, because if you don't understand how to do something or find it complicated what good is a comment telling you that you need to improve on it once you already know you do.

Only when the comment is oral.

With regard to students' openness toward receiving comment only feedback before the intervention, the most common themes established from the analysis of qualitative responses to the question “Would you like to get feedback without a grade?” are represented in the following quotes:

No, because it's important to see where I'm at and how I'm getting on. After all, in the Leaving Cert it will be about the grades.

No, because you would know if you must go up a grade to achieve the points you need for the leaving.

More of an impact if you get a bad grade than a bad comment.

Yes, it is more useful and it shows you where you went wrong. If you did badly it doesn't knock your confidence as much.

After students experienced comment only marking they were more open towards receiving comments instead of grades (at least sometimes) and many respondents now described advantages of this method, in response to the same question, as is demonstrated by the quotes below:

Sometimes, because they help me to understand where I'm going wrong.

Sometimes, no one compares their results and people cannot boast.

Sometimes, if you do badly on the test you are more likely to just look at the comments, not the grade. If you do well, you think you know it all and only look at the grade not the comments because you don't feel you need them.

Sometimes, because I don't always know exactly how I did, which is how it would usually be for a normal exam.

Yes, it shows you how to improve in your tests.

When asked (after the intervention) “What do you think the benefits are to receiving comment only marking on your work?” respondents described many benefits:

Students can clearly see where they are going wrong or right. Self-esteem is boosted.

Tells you where you went wrong, so the rest of the time you can do it right.

It means you have to read through them because the grade is not there to give you an immediate answer on what you did.

Sometimes if you get a comment and a grade you will only focus on the grade.

You don't feel too intimidated if you didn't do great because you can't compare results to other peoples.

I corrected my work better because I know where I am wrong.

I got it right the next time and I know how to do it now.

It was easier to identify your mistake and to rectify it than with a grade only marking system.

Gives a more realistic picture of how much work you have to do. If you do very well in one part of the test and not so well in the other part you might get an okay grade. You get more information back from it.

In response to the question “What do you think the disadvantages are to receiving comment only marking on your work” a number of disadvantages were also described. They are captured by the quotes below:

You don't work as hard because your parents won't know exactly what result you're getting.

People when they get a comment instead of their result they will not take that much notice.

When you have a grade you aim to achieve a better mark next time.

Grades make you study more because you always want a good grade. If you don't get them why should you study anymore and why should you be interested in the comments.

You don't have a grade so you don't know if you are making progress from one test to the next.

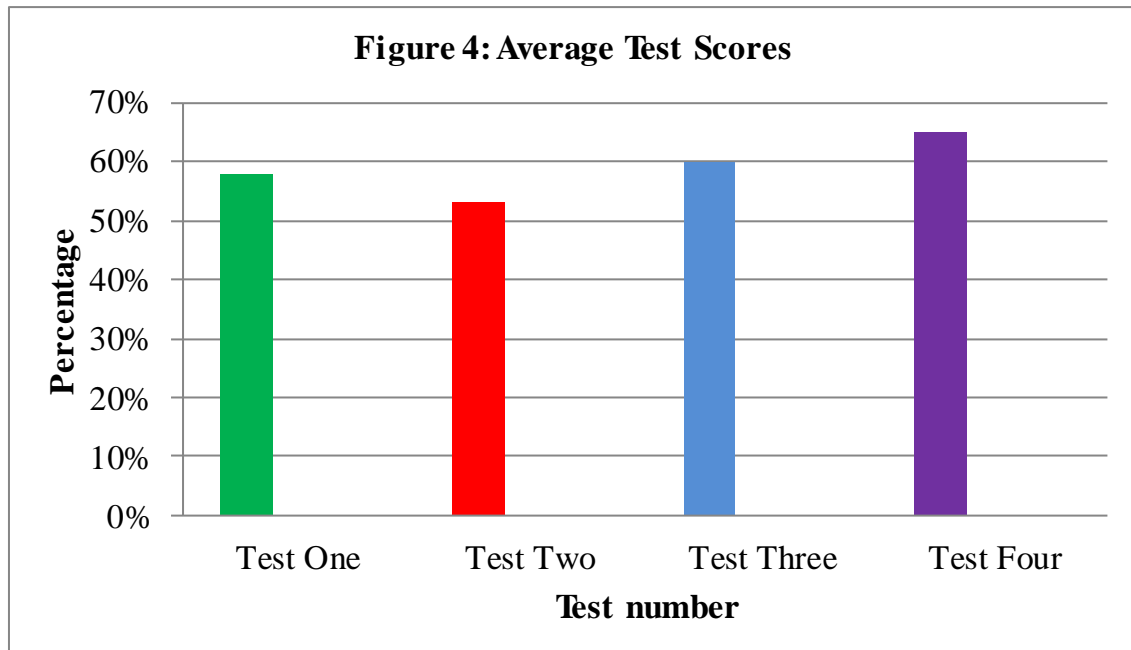
At the end of the day it's the points that decide the rest of your life not the comments.

It's just a comment, there's no grade so mom and dad won't know how you did. When the grade is there they ask how you're doing and they have an accurate picture with the grade.

You know yourself how you're getting on.

Impact of comment only marking on student performance

The participants received comment only marking on four tests over a five week period. The results of these tests are shown in Figure 4 below.



DISCUSSION

Research suggests that comment only marking enhances student achievement more than grade only or grade and comment marking (Butler, 1988). All students who took part in this study had previously received grade only or grade and comment marking. As the tests used for this study varied in topic and because of the short time period of this study, it is difficult to assess the impact of the comment only marking on students' achievement. However, this study has offered rich insights into Irish students' attitudes towards comment only marking.

The findings showed that many students changed their attitudes in relation to comment only marking over the five week period. Before the intervention, most students preferred to receive feedback with grades. There was a widespread perception that grades were necessary for them to assess their performance. However, after receiving comment only marking regularly over a five week period, students recognised many benefits and most participants felt that this type of feedback could help them to improve their understanding. This change of attitude may, at least partially, be a result of having mostly experienced brief and non-specific feedback comments rather than Petty's (2009) 'Medals, Missions and Goals' (or similar task-oriented feedback methods) in the past, supporting the idea that task-involving

assessment is more beneficial to learners than ego-involving assessment (Black and Wiliam, 2006).

After the intervention, nearly three quarters of students stated that they would like to receive comment only feedback sometimes. They felt that comment only marking gave a more realistic view of how much work needed to be done compared to an overall grade. Students thought it highlighted the areas that they needed to improve on and focused them on working towards and achieving specific and shared goals.

Alongside the academic advantages of comment only marking some students recognised that this form of feedback could lead to a more comfortable learning environment as it prevented boasting about high grades in the classroom. They also noted that comment only marking was not detrimental to the confidence of students who receive low grades. This is supported by Butler's (1988) comment only marking study (1988) as well as by Black and Wiliam's (2006) research.

Although students were now more accepting of this form of assessment, when given the choice, the majority of students indicated that they would still prefer to receive comments with grades on their work. The contradiction between this preference and their clear recognition of the benefits of comment only feedback (and of *not* receiving a grade) is likely the result of an emerging tension between students' positive experiences with comment only marking and their understanding of (and enculturation into) the Irish education system as exam and grades focused. Interestingly, findings of this study mirror the findings of an earlier study conducted by the National Council for Curriculum and Assessment (NCCA, 2005) indicating that many teachers in Ireland believed that their comments on student work were only valued by students when backed up with a solid grade.

For comment only marking to be effective in the classroom it must be accepted and valued by students and teachers. Students who disagreed with comment only marking wanted grades to affirm the teacher's comments. They felt comments alone were worthless as they believed they were unrelated to the current examination system. Some participants furthermore argued that comment only marking could impact negatively on students' motivation to work hard as their parents would not have as accurate a picture of their results. Similar to the study conducted by the NCCA in 2005 students who challenged comment only marking were primarily high achieving students suggesting that higher achievers are more accepting of ego-focused feedback.

CONCLUSION

Kate's engagement with this study has been positive. It has reaffirmed for her the positive impact that comment only marking can have in the classroom. Most of the participating students found the comment only method of assessment useful and recognised its benefits with regard to improving their engagement and understanding as well as general classroom atmosphere. To further examine the impact of comment only marking, future research

would benefit from a larger and more diverse sample of participants and from a longer study period. Areas for further study could also include comparisons of comment only marking with other formative assessment strategies.

The current terminal and high-stakes state examination system in Ireland does not support the widespread use of formative and task-oriented assessment (NCCA, 2011). As a result students develop a grade-focused mind set throughout second-level education beginning in 1st year. The students who challenged comment only marking were high achievers who are concerned about their final results which will influence their future education and, ultimately, career opportunities.

This study has shown the challenges associated with implementing formative assessment strategies in the Irish classroom, particularly in senior cycle where pedagogical approaches are strongly influenced by exam pressures. In the current system, students develop a grade centred performance mindset from early on in their second-level education in Ireland. The recent introduction of a new mathematics syllabus - Project Maths - and the proposed Junior Cycle Student Award (JCSA) highlight the relevance and importance of formative assessment in the classroom and will, hopefully, support a transition towards the use of more task-oriented assessment approaches. This study has shown that students are very open to and easily recognise the benefits of task-oriented comment only feedback.

Kathleen O'Mahoney is a teacher of Mathematics and Applied Mathematics. She undertook this this action research study as a student of the Bachelor of Mathematics and Education (BME) programme at the National University of Ireland Galway.

Manuela Heinz is a lecturer at the School of Education at the National University of Ireland Galway. She worked with Kate on her action research project and research paper development as her university tutor.

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