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Teachers' Perceptions of Using Incentives in State Examinations to Increase the uptake of Higher Level Mathematics

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Background to the Study

In Ireland, all students sit a summative state examination known formally as the Leaving Certificate (LC) at the end of Senior Cycle (upper secondary level). The LC acts as a gatekeeper to tertiary level education with students awarded points based on their six best graded subjects. Different points are also awarded pending the level of which the subject was studied. For example, the majority of subjects have two levels. The most challenging level is Higher Level (HL - often referred to as Honours) and the next level down is Ordinary Level (OL - often referred to as Pass). Since 2012 mathematics has been assigned a special status within the Irish post-primary school curriculum with the introduction of a Bonus Points initiative (BPI). Students are now awarded an extra 25 points in their LC examination results if they achieve a passing grade at HL. The awarding of these extra points was introduced to encourage students to study mathematics at HL. Such incentive schemes for studying mathematics and improving student performance in the subject are not a new phenomenon. Similar schemes exist in Australia and Israel (Treacy, 2018).

In Ireland while the numbers opting for HL mathematics have nearly doubled since the introduction of the BPI, anecdotally there have been many mixed reviews. Hence, while there have been calls in some quarters to extend this initiative to other subjects, it is important that the impact of the BPI on the study and assessment of mathematics is first appraised. This paper investigates the advantages and disadvantages associated with the BPI from the perspective of mathematics teachers (n=266) and aims to address the following research question: What are mathematics teachers' perceptions of the Bonus Points Initiative as an incentive in state examinations?

Methodology

The methodology of this study involved the distribution of a questionnaire to a representative sample of HL mathematics teachers in Irish post-primary schools (n = 723). The instrument was designed specifically for this study and was developed by the authors with the assistance of an advisory group involving five experienced post-primary mathematics teachers. It comprised of four main sections. Section 4, which is the focus of this submission, inquired of teachers' perceptions of the BPI through a series of multiple choice and open-ended questions. The finalized questionnaires were distributed (two to a stratified sample of 400 post-primary schools) in early April 2018. The response rate was 266 second level teachers (approx. 33%). The open-ended questionnaire data was analysed thematically in two stages. Firstly, the first coder coded the two sets of data (perceived

advantages and disadvantages) himself two weeks apart, and the *intra*-coder agreement percentages were equally high (> 90%). The second coder subsequently coded around a third of each dataset and once again the inter-coder agreement percentages were > 90% for the perceived advantages and disadvantages, highlighting that the coding frameworks that we developed for this study's analysis were reliable.

Findings and Discussion

Findings from both the qualitative and quantitative data in this study indicate that teachers hold many mixed opinions regarding the BPI. While 46% of respondents indicated that they agree with the BPI, the rest were either not sure or did not agree. The main advantage of the initiative was that it increased uptake and perseverance of mathematics at HL. However, while the numbers taking HL may have increased, respondents noted some concerns about the standard of students now persisting at HL. A greater proportion of students that would have typically attempted the OL examination, were it not for the BPI, were now attempting the HL examination and thus there was an increase in those achieving low grades (SEC 2015). There were also fears that the LC HL mathematics examination would be 'dumbed down' to cater for the surge in students now taking it. It was feared that "*Students of a stronger mathematics ability may not be extended to the same degree*".

However, while these concerns are real, there were also many advantages of the BPI which were noted by the participating teachers. The second most cited benefit was that it rewarded students for the time and effort required for the course. Concern has long been expressed at the workload and timeframe of the LC HL mathematics curriculum in Ireland (Cosgrove et al., 2013). In addition to the workload and timeframe, a study carried out by Smyth, Banks, and Calvert (2011) found that mathematics is considered to be among the top five most difficult LC subjects. Thus the BPI rewards students for their exertions and supports the view that mathematics is not 'just another subject' (McDonagh & Quinlan, 2012).

However, the findings of this study indicate that while there are clear advantages to the special status that the BPI has given mathematics within the Irish post-primary school curriculum, there was also a number of interlinking disadvantages which must be considered if such incentive schemes are to be maintained, and indeed expanded.

References

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