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ASSESSMENT DRIVES STUDENT LEARNING: EVIDENCE FOR SUMMATIVE ASSESSMENT FROM PAKISTAN

Abstract: Research studies from various parts of the world indicate that university students find research methodology courses among the most difficult subjects to grasp. Students in Pakistan display similar attitudes towards learning of research. Those of us who teach research at the institutions of higher learning in Pakistan continuously hear students describe research as one of the most ‘difficult and dry’ subject they have to study. Hence, we as teachers of research at these institutions keep looking for ways to increase students’ interest in and academic achievement of research. In that spirit, we designed two assessment tasks for a research methodology course at Master’s level and used them to assess the difference in learning. For one of the assignments assessment was summative with final official grade at the end of the semester while the other was put through formative assessment and no official final grade was assigned to it. The results of our study reinforce the centrality of assessment to the learning of students and indicate that students’ put more efforts in learning a task that carries final grade. Although our results do not support the effectiveness of formative assessment we have raised concerns about the ‘dialogical’ nature of feedback to students. Despite the fact that the context of our study is Pakistan, the implications of our research may be discussed in the larger context of teaching and learning of research especially in contexts where the medium of instruction is not local or national language.

Keywords: assessment, formative, summative, research methods teaching, higher education, medium of instruction, Pakistan.

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Introduction

Teaching and learning of research in the institutions of higher learning, by and large, is considered difficult by both teachers and students (Breuer and Schreier 2007; Rushing and Winfield 1999; Takata and Leiting 1987; Wiggins & Burns 2009). In Pakistan we constantly hear students complaining about research courses as the most 'difficult and dry' subjects they have to study (Qureshi 2013; Vazir and Qureshi 2011). Even as researchers are worried about the general state of teaching in higher education institutions (Ali 2008; Hoodbhoy 2009; Khan 2005; Raza, Naqui & Lodhi, 2011), teachers like us are particularly troubled by our students' poor performance in research courses (Qureshi 2013). On our part for engaging students in research methods courses, we have been experimenting with various teaching strategies (Vazir and Qureshi 2011). Nevertheless, like Rushing and Winfield (1999) and Takata and Leiting (1987), our main focus was on 'learning by doing' approach to teaching research till Wood's (2009) work drew our attention toward the use of assessment strategies for increasing students' understanding of the research related concepts. Wood(2009:5) believes that "Assessment not only drives learning it may also help learning". While still looking for ways to better 'teach' research we also started exploring effective strategies of assessment for gauging students' learning (and our teaching) of particular concepts in research methods courses. What follows is the description of such an experiment that was carried out in one of the institutions of higher education in Pakistan. The purpose was to test whether assessment really drives learning in higher education institutions as Wood (2009) has suggested.

Conceptual context of the study

Research in education emphasizes the function of assessment as the driver of student learning (Al-Kadri 2013; Cowan and Cherry 2012; Garrison and Ehringhaus 2007; Guskey 2003; Stiggins 2002). By and large there is also agreement on the purposes of assessment; assessment for learning (formative) and assessment of learning (summative), but no consensus on the general effects of either type of assessment on students' learning has been reached. Researchers advocate formative assessment because they believe it contributes to classroom learning (Black et al.2006; Brown 2005; Dylan and Thompson2008; Narciss2004;Norman et al. 2010; Rushton2005 among others). These people opposesummative assessment on grounds that it concentrates on end of the term or unit tests that may not reflect student's understanding of the concepts.While Rust (2011) opposes summative strategies because he thinks institutions "(mis)use numbers to judge and record students' assessment" (p.1); Raupach et al. (2013) and Rodiger and Karpicke.(2006) are more optimistic about the positive role of summative strategies. Torrance (2007) and Harlen (2005), see assessment as learning and not of or for learning per se thus promoting a blend of the two whereas Knight (2002) is skeptical of both formative and summative assessment practices at the higher education level.

In Pakistan, traditionally the emphasis has been on summative assessment in schools through higher education institutions with annual examinations at the end of each academic year (Ahmed et al. 2013). In 1970's universities started moving away from annual to semester based system of schooling (Iqbal 2013). One of the mandates of the Higher Education Commission of Pakistan, established in 2002, is to promote a mix of formative and summative strategies of assessment (HEC website). At the same time the computerized National Admission Test, Graduate Assessment Tests and the establishment of National Testing Service (NTS) in 2002 reflect inclination toward summative assessment. Majority of the educational institutions still

allocate larger share to summative vs. formative assessment of student achievements but very little research has been carried out to analyze the effectiveness of assessment practices in Pakistani institutions of higher learning (Ahmed et al. 2013; Buzdor et al. 2013; Hussain 2010; Iqbal 2004; Naemullah 2007; Rehmani 2003; Shah 2002; Shirazi 2004; Urooj and Ahmed 2012). Rarely has any researcher in Pakistan contested the notion of assessment driving learning or done a comparison of which assessment practices work better. Therefore, the need for such research cannot be overemphasized. Hence like Raupach et al. (2013), we also decided to check if assessment really drives learning in higher education institutions and if so which of the two types, i.e., summative vs. formative is more at work? For this purpose we conducted a small scale correlational research study in an institution of higher learning in Pakistan. The purpose was to explore the relationship with the help of two interrelated research questions;

1. To what extent assessment drives learning?
2. What is the relationship between formative assessment and student learning?

Physical context of the study

One institution of higher learning in Pakistan was selected for this study which offers Master's program in Education. Two intact groups of students (28, 32), enrolled in two classes of Research Methods in spring and fall semesters were chosen as convenience sample for the study. Both groups were taught by the same instructor and were exposed to similar content and teaching strategies. Total sample size was 60. As the focus of the study is the differences created by assessment practices, therefore, group comparisons per se are not included.

Theoretical context of the study

Based on the existing (and expanding) body of research literature in the field plus our observations and experiences of assessment practices in the institutions of Higher education in Pakistan, we theorize that students put more efforts into understanding and completing the tasks which are subjected to summative assessment. Students receive marks (and final grades) for such tasks; these grades are officially recorded and reflect 'more' of learning. At the same time, we also believe that students by and large are "conscientious consumer [s]" (Higgins, Hartley & Skelton, 2002, p.53); therefore, we expect that students pay more attention "and seek feedback which will help them to engage in their subject in a 'deep' way" (Higgins Hartley & Skelton, 2002:53). However, there is a caveat; students are more likely to translate feedback effectively into their assignments for summative assessment, hence, the impact of feedback will be more visible in 'before' and 'after' feedback comparison of tasks. But if we heed to Gibbs and Simpson (2003)'s warning that many students do not read and use feedback for improving their understanding of the topic, then there would be either no or close to zero difference between the scores of summative and formative assignments. The present research was conducted to in order to test this theory.

Study design and Procedure

The purpose of our research was to compare two types of assessment practices, i.e., formative and summative but we did not separate the two classes as formative and summative groups because, a) it would have been unethical, and b) our purpose was not to compare groups per se but assessment practices which went beyond group boundaries. Hence, for this study every student went through the experience of both types of assessment; if summative assessment was applied to review article for spring semester, formative

assessment was applied for the fall class and the marks were not included in the final grade for fall semester. In the same way, questionnaire administration was formally assessed for the fall class but was given as home-task to spring class and the assessment was formative. Similar was the case for corresponding quizzes. Table 1 below presents the implementation scheme

Table 1: Administration schema for assessment

	Spring 2011	Fall 2011
Summative assessment	<ul style="list-style-type: none"> • Review article plus • Corresponding quiz 	<ul style="list-style-type: none"> • Questionnaire plus • Corresponding quiz
Formative Assessment	<ul style="list-style-type: none"> • Questionnaire as home task • Corresponding quiz, taken in-class, formative assessment 	<ul style="list-style-type: none"> • Review article as home task • Corresponding quiz, taken in-class, formative assessment

Tools for assessment

Two written assignments (worth 30 points each) and two quizzes (worth 20 points each) were administered for the purposes of assessing the relationship between assessment and learning. One assignment was to produce review article on a topic relevant to course material. The purpose of the assignment was to expose students to the state of research in their selected area and sharpen their analytical skills through summary, synthesis, comparison and evaluation of the research literature. For the other assignment students administered questionnaires in actual classrooms and had post-administration focus group discussions with a small sample of their students on item clarity, relevance and comprehension. The purpose of the assignment was to enhance students' learning about the usage of questionnaire as a research tool for collecting teaching and learning related data. All students were required to make in-class presentations and receive feedback for future improvement. The week following the presentations, students were given quizzes. Final results were compared at the end of semesters.

The summative assessment for this study was done in line with the 'assessment of learning.' For the students enrolled in spring semester it was measured as 'the final grade obtained by a student at the end of the semester for writing the Review article assignment and its corresponding quiz. Similarly for the students enrolled in fall semester it was 'the final grade obtained by a student at the end of the semester for the write up of the Questionnaire activity and its corresponding quiz.

The formative assessment, on the other, hand is not that straightforward (see Capraro, et al., 2011 for a review of operational definitions of the types). One practice of formative assessment, on which majority of educators/ researchers agree, is the role of 'feedback' in the learning of students. (Hattie and Timperley 2007; Shute 2007). For the present study, written feedback was used as a formative assessment practice 'for learning.' The feedback was given to all students for both assignments and quizzes. They also received numeric marks for the current state of their work. The only difference was that the numeric marks students received for the Review article assignment and its corresponding quiz in spring and for the write up of the Questionnaire activity and its corresponding quiz in Fall respectively were considered 'formative' grades and did not become part of their 'official' transcript.

To assess the learning from formative assessment, students' score for quizzes were compared separately as all students received general instructions in class as well as specific feedback for further development. Therefore, other things being equal, there should be a positive relationship between feedback and student performance. Our position was that quizzes gave second chance to students for further improving their assignments. Hence we expected students with high scores on summative assignment would also have high score on quiz 'with' summative assessment because for our students the; "feedback and directed feed forward were linked into the next submission" just like the students of Parry, Larsen and Walsh (2008:1).

For the study, we tested three hypotheses;

- Hypothesis 1: Students' scores will be higher on summative tasks and lower on tasks with formative assessment.
 - Correlation between summative assignment and formative assignment will be negative.
 - Correlation between summative quiz and formative assignment will be negative.
- Hypothesis 2: Students with high scores on summative assignment will also have high score on quiz 'with' summative assessment.
 - Correlation between summative assignment and summative quiz will be positive.
- Hypothesis 3: Students scores on quiz with summative assessment will not be related to their scores on quiz with informal assessment.
 - Correlation between summative quiz and informal quiz will be zero.

Results

Table 2 (below) displays the Descriptive statistic for the data. The four important values reported in the Table provide an overview of the marks distribution for both groups.

Table 2: Descriptive statistic

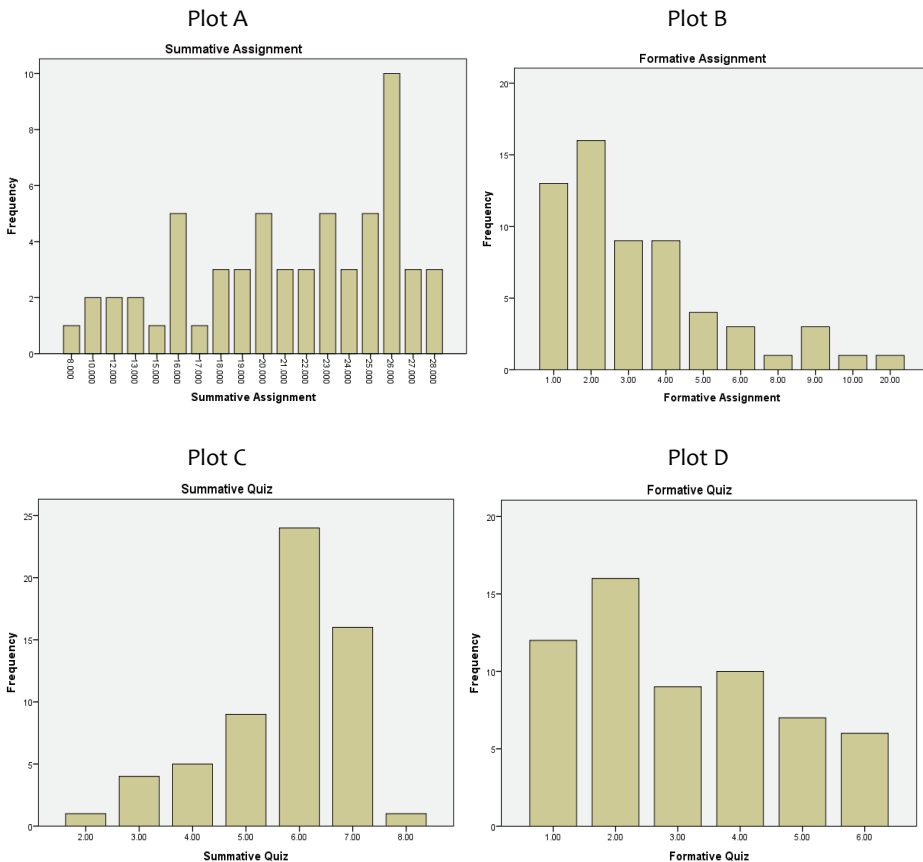
Descriptive	Group 1 (N = 60)			
	Summative assessment		Formative assessment	
	Assignment	Quiz	Assignment	Quiz
Mean	21.12	5.72	3.52	3.03
*Median	22.00	6.00	3.00	3.00
Std.Deviation	5.14	1.28	3.12	1.63
Skewness	-.72	-.96	2.96	.41
Kurtosis	-.31	.55	12.54	-1.006
minimum	8.00	2	1.00	1
maximum	28.00	7	20.00	6

*Field (2013) recommends reporting Median along with Mean for skewed distributions.

Students generally scored higher on tasks which were formally assessed; Mean values are higher for 'with assessment' tasks. The value of Kurtosis is < 3 for all tasks with one exception (large positive $12.54 > 3$ indicates a leptokurtic distribution with higher peak and fatter tails). The values of < 3 indicate Platykurtic distribution which is flatter with a wider peak and less probability for extreme values than for a normal distribution as the values are wider spread around the respective means. The values of SD's also confirm that the data set is more spread

out besides being negatively skewed for ‘with summative assessment’ tasks. When we compare these results with positively skewed distribution of scores on assignments and quizzes ‘with formative assessment,’ it can be concluded that students generally scored poorly on assignments with formative assessment. This also means that the difference between the positively skewed distributions for tasks assessed with formative strategy and the negatively skewed distributions for tasks assessed with summative grade can be taken as an indicator of how much students have learned while working on the assignments for their final grades. This lends support to our first Hypothesis.

As the shape and spread statistics of the marks distribution above, i.e., a leptokurtic/Platykurtic and skewed distributions, point towards the data set falling short of meeting some of the basic requirements of a normal distribution, therefore, we also analyzed the graphical view of our data. By using Modal frequency analysis one can see that the value of Mode for assignment for summative assessment is much higher (Plot A, Mode = 26) than the assignment with formative assessment (Plot B, Mode = 2) and a large majority of the scores is concentrated toward the lower end of the distribution showing that students generally performed poorly on tasks that were informally assessed. The same pattern is visible with scores on quizzes (Plot C, Mode = 6 and Plot D, Mode = 2 respectively).



In order to test the strength and direction of the relationship between assessment and learning, we chose Spearman's rho which is the non-parametric counterpart of Pearson correlation coefficient. Our data set met both the assumptions for using this coefficient; a) our variables are measured at interval level, i.e., assignment and quiz marks are 0-30 and 0-10 respectively, and b) relationship between the two variables is monotonic (Field 2013). The Spearman's rho test revealed a moderate negative correlation between the scores of Summative and Formative assessment which was statistically significant ($r_s[60] = -.308, p < .01$). A moderate negative correlation was also found between the scores of Summative quiz and Formative assignment. The relationship was statistically significant; ($r_s[60] = -.405, p < .01$). These results are in the expected direction and lend support to our first hypothesis that students performed better on tests for summative assessment. Based on these results we can also claim like Raupach et al (2013) that summative assessment is "more powerful driver of student learning" (p.1) as they generally put more effort into learning for formal assessment.

The correlation test also indicated that the students' scores for Summative quiz were weakly and negatively related to their scores on Summative assignment; ($r_s[60] = -.118, p > .05$). This relationship was neither in the expected direction (should have been positive) nor was significant statistically. Therefore, though conceptually a positive relationship between effective utilization of feedback and improvement of summative assignment makes sense, the empirical data does not support the thesis; hence we fail to reject the null hypothesis of no relation between feedback and further improvement.

Spearman's rho further indicated that the students' scores on Summative quiz were unrelated to their scores on Formative quiz; ($r_s[60] = -.026, p > .05$). The relationship, though in the expected direction (with negative sign), was not significant statistically. Therefore, our third hypothesis is not proven.

Discussion of the findings

Assessment of teaching and learning of research methodology, like any other academic discipline, is a complex process. But unlike most other disciplines not much research has been done in this area (see Wagner, Garner & Kawulich, 2011 for review). The results of our study corroborate the existing evidence for assessment, especially summative, being a force behind student learning. Although the substantiation is mainly based on western experiences, our study by validating these findings raises an important question about the assessment context and its impact on student learning. In Pakistan, the learning environment has long been dominated by summative assessment at the end of academic year. A large majority of the students coming to the institutions of higher learning has more experiences of summative than formative assessment (Qureshi 2013). Moreover, significant number of educational institutions still practice summative assessment despite the fact that the Higher Education Commission of Pakistan has provided standard guidelines to ensure that all colleges and universities use more of formative assessment strategies in order to enhance student achievements. Against this backdrop the results of our study are not surprising but one of the 'non-significant' relationships, i.e., the unrelated scores of quizzes, has implications for research and policy for higher education. In Pakistan there are two commonly held (mis)perceptions prevalent among policy makers; a) summative assessment is the root cause of the declining standards of education as it affects every aspect of teaching and learning in classrooms (Rehmani, 2003), and b) semester system is equal to formative assessment. To the best of our knowledge, no research based evidence is available in Pakistan to vouch for

formative assessment increasing or having no effect on students' learning. At the same time the push for formative assessment especially by HEC, explicitly or implicitly, gives the impression that formative assessment is better despite no proof of consensus on the impact of formative and/ or summative assessment strategies on students' learning in the literature.

Furthermore, research on formative assessment itself is inconclusive as well as conditional; for instance, on one hand Yorke (2001) leans toward formative assessment because it is "dialogic" (p.117); students receive feedback and thus get a second chance for improving their academic performance. Similarly, Dunn and Mulvenon (2009) while favoring formative assessment also draw our attention toward the limited impact of formative assessment on student learning. On the other hand while not negating the potential of feedback for improving students' formally assessed assignments, Crisp (2007), Duncan (2007) and Sadler (2010), caution educators that students do not pay much attention to instructors' feedback which is considered to be the hallmark of formative assessment, therefore, feedback (or formative assessment by implication) may not always be as effective as educationists think and policy makers seem to believe.

Similarly, while we may be in agreement with the analyses of the researchers, mentioned above, we restrict ourselves from generalizing the findings of our study beyond the study sample in lieu of the limitations; our study is based on convenience sample of intact groups which may or may not be representative of the student universe in Pakistan. However, given that Higher Education Commission of Pakistan has a mandate to promote research and research culture in Pakistani institutions of higher learning; it makes us one of the stakeholders. Therefore, we recommend that HEC should plan on commissioning a series of research studies in the area of assessment of teaching and learning especially of research. Such endeavor will increase awareness of multiple assessment techniques by providing empirical evidence about their effectiveness (or otherwise). At the same time, it will also encourage collaborative research work on more effective assessment techniques for the institutions of higher learning in Pakistan where stakes are higher for students and teachers alike because of 'publish or perish' culture for teachers and the requirement of submitting proof of research activities as part of the degree requirements for students.

Conclusion

Assessment of educational outcomes in any discipline area is a complex process. Researchers in this field have, by and large, remained divided on the question of whether summative or formative assessment is more successful in driving students' learning. The present study has made an important contribution to the small emerging body of literature depicting the experiences of transition societies like Pakistan. The input to the larger body of knowledge on the assessment of teaching and learning of research is also noteworthy for our study has explored two interrelated questions; to what extent assessment drives learning in a research course and what is the relationship between formative assessment and student learning for such a course? Although our research has provided empirical evidence that in our sample of students' summative assessment was the engine that drove learning, we remain cautious in generalizing our findings beyond the sample. Nonetheless, the study has highlighted the paucity of literature in the area of assessment in Pakistan and the need for further research is indicated.

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