

# Workload Implication of Integrated Assessment: a Case Study

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## ABSTRACT

Assessment approaches are found to be the most effective factor that influences student learning. However, heavy semester workload may not allow students to pay the expected attention to their learning and assessments, which may in turn, cause a lack of deep learning, as they may focus on completion and passing rather than learning and achieving high grades. This issue could be overcome if we couple correlated papers in our curriculum through assessment, following an integrated assessment concept. This could allow for more efficient management of workload by students, motivate them to consider connections between papers in their learning process and experience how to link knowledge in related areas. The approach of this study uses the same scenario and user requirements over two semesters to demonstrate student achievement of learning outcomes for both Application Development and Human Computer Interaction (HCI) papers. This allows students to revisit their previous work and improve it according to HCI learning outcomes, to transfer knowledge between students, and to overcome some of the challenges associated with integrated assessments. Students' perceptions of workload and learning experience as well as challenges and strengths of this approach have been evaluated via students' feedback, through survey and reflection.

## Categories and Subject Descriptors

K.3.2 [Computer and Information Science Education]: Information systems education

## General Terms

Management, Human Factors

## Keywords

Integrated assessment, course workload, collaborative learning, information technology

## 1. INTRODUCTION

The range of assessment tools may vary according to institutional policy, educator, and education tradition. However they often share some characteristics like focusing on assessment of learning, being limited in scope, encouraging teaching for assessment and ignoring individual learning [3]. Since the 1990s it has been claimed that learning in an academic environment is assessment driven. Willis [13] states that failure to develop a clear relationship between learning and assessment produces a mismatch between the expected high quality learning and the provided poor quality learning that seems likely to result from

associated assessment procedures. She also asserted that learning cannot be treated as a product anymore; rather it is a process closely associated with student motivation. Walker [14] states that assessment is not worth doing if it does not support the purpose of improving student learning.

Quality assessment adopts the methodology most appropriate to the context, the learners, the topics, and the level. Innovative assessment approaches have been encouraged by different educational organisations; however traditional assessments are still in use in many areas. Biggs [2] notes that students are not learning as well as they could be, and that it is important to organise practice on the basis of what students should be doing rather than focusing only on what teachers do.

Race [10] identified 10 different assessment methodologies with their respective advantages and drawbacks. One of the most popular methodologies in the information technology field is assessing practical work; but it is often difficult to assess such work. Assessing reports of practical work may only involve measuring the end-product quality of the practical work, and not the work itself. It is also recognized that traditional assessment often assesses learning of a single component of study. Boud [4] notes that traditional assessment practices in higher education did not prepare students well for lifetime learning and challenges, and also states that assessment practices should be judged on whether or not they effectively prepare students for learning beyond the academic environment once formal study and assessment is no longer available. It has long been assumed that the main well known purposes of assessments are providing certification of achievement and facilitating learning [5]. This work has identified learning for the long term as a main purpose for assessment and discusses whether summative and formative assessment practices can equip students for lifetime learning.

This study aims to investigate the feasibility of using an integrated assessment approach to link two practical base papers, in the information technology area. The drive for this study is to investigate whether an integrated assessment could ease the assessment workload for students. In addition it may extend in-depth learning, encourage lifetime learning, and motivate students to clearly see the link between components of the study.

## 2. BACKGROUND

### 2.1 WHAT IS AN INTEGRATED ASSESSMENT?

Integrated assessments involve assessment tools in which related or complementary learning outcomes can be assessed using the same assessment activity or evidence. Integration of assessment reduces the time spent on assessment, and assists in facilitating a more comprehensive assessment approach [9].

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Boud [5] summarised the characteristics of integrated assessments as follows.

- Combine both new and old assessment methods;
- Provide new perspectives on 'test' validity;
- Develop new methods;
- Integrate formative and summative assessment modes;
- Are economical.

Integrated assessments however pose some challenges. Vanderheide [12] outlined concerns about confusion experienced by some students as they tried to identify what sections in the assessment belonged to each unit. Another challenge was related to students' concern that if they failed to perform well in the assessment, then it would ruin two units instead of one. Other integrated assessment challenges could arise in a situation when students enrol in a program and they have already completed some papers which are part of integrated assessment in another context. All of these challenges could contribute to the assessor's decision of whether to implement integrated assessment or not.

## 2.2 COURSE WORKLOAD

An important factor that leads to success in degree study is students' workload. An interpretation of workload measure could be the number of contact hours for classes plus the time spent on revision, assessment and independent study. Institutions try to maintain even workload for various papers. In general heavy workload may not allow students to explore materials in depth and this in turn leads to lack of deep learning.

Besides assessment there are a few other factors that influence students' perception of workload, such as task complexity, materials difficulty, the relationship between assessor and students and relationships among students themselves. Kyndt [8] outlined that it is difficult for students to distinguish between workload and task complexity. Kember [7] noted that it is possible to motivate students to spend more hours working to achieve high quality learning outcomes by paying more attention to assessment, curriculum and teaching approach [1]. Bowyer [6] stated workload is a factor that influences student's decision to withdraw from their study before completion of the course. Bowyer [6] summarised the main components which need to be considered while assessing students' course workload, including resources, teaching quality, and student support, assessment difficulty, time, student characteristics and effort.

This study explores the effect of integrated assessment on students' perception of workload and learning experience.

## 3. METHOD

### 3.1 PROCEDURE AND DATA COLLECTED

Based on the motivations outlined previously, a study was conducted to investigate the effects of integrated assessment on course workload and students' performance in information technology assessment tasks, as well as to evaluate challenges and strengths of this approach. There were a total of 12 participants in this study, all of whom were international students falling into a wide range of ethnicities. Indian students made up the largest group at 58.3%, with the remainder being distributed among other ethnicities, such as Japanese, Chinese and Pacific Islander. The courses were intended primarily for Bachelor of Information Technology and Graduate Diploma of Information Technology students. The greater proportion of the participants (58.3%) was

Graduate Diploma students and 41.7% were Bachelor's degree students. For our Graduate Diploma and Bachelor's degree, the industry project course is compulsory and therefore scenarios are used in teaching various papers. This is to provide students the overview of industry experience with a fair opportunity to manage and solve successfully real business problems in the future.

For the purpose of this study a link has been established between Application Development and Human Computer Interaction papers through a common assessment scenario and user requirements, to study the effect of this approach on students' performance and workload. The assessment offers students the opportunity to experience the link between these two papers by redesigning their own user interface while learning HCI concepts.

The students initially enrolled in the Application Development paper, and were given an individual assessment to develop an application for Point of Sale (POS). The requirements include activities that fulfil the need of admin and sale user groups. The students at this stage have no knowledge of HCI, and they were instructed to focus on developing the required functionalities through a simple user interface for which they could use their current experience and common sense to develop.

In the next semester the students enrolled in the HCI paper. Half of the class roll was made up of students who had completed the Application Development paper in the previous semester, and in this paper are referred to as Group1 (G1). The other half are students who are enrolled for both papers at the same time, and are referred to as Group2 (G2). The students were instructed to pair themselves with each pair including one student from G1 and one student from G2. At this stage a discussion session was conducted with students to select one of the following options to apply HCI concepts:

- Either, use the Point of Sale application developed by G1 students in the previous semester (Option One)
- Or, use the Door to Door Sale scenario students of G2 students will develop in the current semester (Option Two)

A decision was made to go for Option One for the following reasons:

- All students would have the chance to evaluate the existing design and get feedback before they redesign the user interface according to HCI learning outcomes
- All G1 students were enrolled for the live project paper in addition to HCI, and the live project is a big component involving quite a heavy workload
- The knowledge G1 students gained from the Application Development paper in the previous semester could be transferred to G2 students while working together

Each pair was instructed to evaluate the existing POS application design according to HCI principles and guidelines, and then redesign the POS user interface to improve user experience. Students' workload perception and learning experience as well as challenges and strengths of this approach was evaluated through analysis of assessment outcomes and by students' feedback through survey and reflection. A questionnaire was distributed to obtain the survey feedback.

### 3.2 SCENARIO AND SAMPLE OF STUDENTS WORK

For the HCI assessment task the students are given the same scenario and user requirements used in Application Development. In this scenario students are required to develop a point of sale system which allows users to maintain product inventory, record staff details and process daily purchase activities. The project is a Windows-based application, and the target user of this system is a novice user. Therefore, an easy-to-use interface is required. To assess students' achievements of Application Development learning outcomes, the application functionality is considered. To assess students' achievements of HCI learning outcomes, the user interface is measured based on HCI guidelines and principles, taking into consideration whether all user functionality has been supported by the interface.

Samples of student work are shown in Figure 1(a) and 1(b). Figure 1(a) shows product maintenance form, a completion message when product is saved has been used to demonstrate "design dialog to yield closure" [11], one of the golden rules of interface design. Figure 1(b) shows maintain staff form, the undo button has been used to fulfil the need of "permit easy reversal of actions" [11] another golden rule of interface design.

In addition, these forms demonstrate some other user interface requirements such as appealing colors, consistency, smooth navigations, considering the limited six weeks timeframe for HCI assessment, the design students produced was up to the level of expectation.

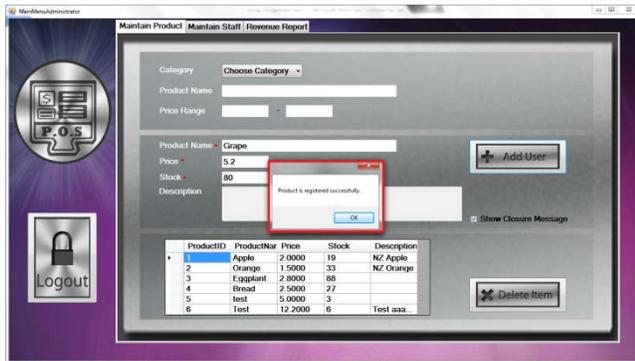


Figure 1(a): POS maintain product form

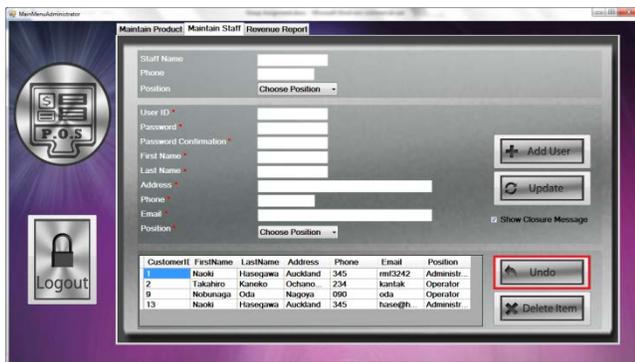


Figure 1(b): POS maintain staff form

### 4. SURVEY RESULTS

There were 12 students who participated in this study, 6 participants in each group. Initially participants' perception of workload has been investigated. Fifty percent of the participants believed they had a heavy or very heavy workload and 42% believed the workload was just right. To investigate the participants' opinion regarding the effect of workload on the students' learning process, two questions have been asked. Figure 2 outlines the survey questions and students' opinion over the Likert-scale of 1-5.

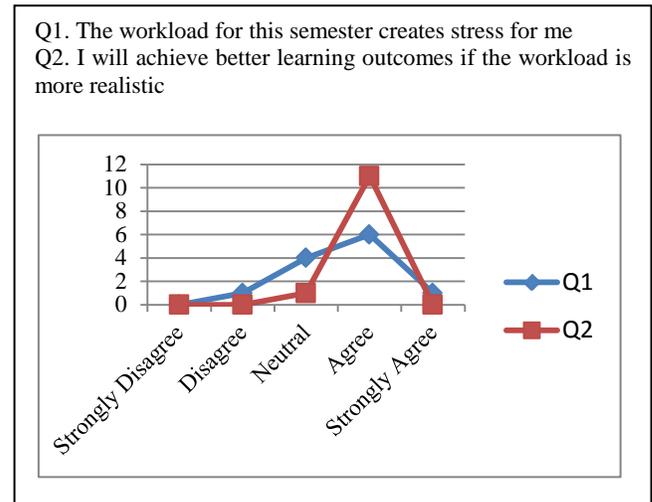


Figure 2: Student's perception of workload

As shown in Figure 2 above, the majority of our students believe the workload creates stress for them and having a realistic workload will improve their learning achievements. In addition 66% of G1 students commented that they think the workload is heavy because of the live project they are doing at the same time with the HCI paper. This suggests the need for an approach that could reduce heavy course workload.

After students completed the assessment I investigated whether they believe the workload of HCI has become more manageable.

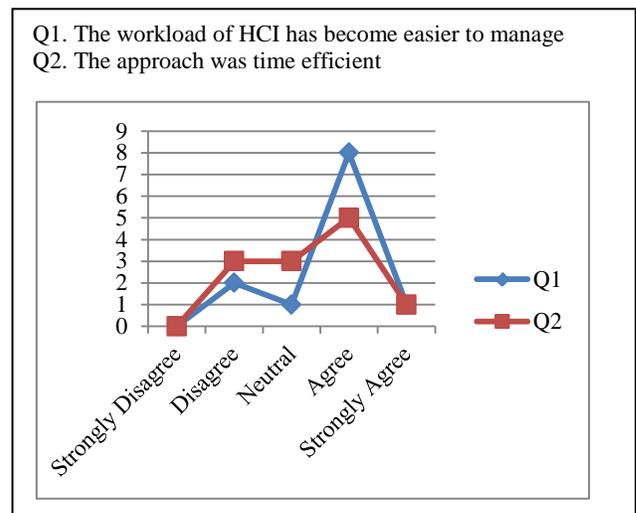


Figure 3, Students perceptions of workload inference of integrated assessment

This study also investigates their learning experience in terms of depth of learning and recognising the connection between different papers and relation to real life practice. Figure 3 outlines the survey questions and students' opinion regarding the effect of this approach on workload.

As shown in Figure 3, 75% of students agree or strongly agree that workload has become easier to manage and 50% agree that the approach is time efficient. In general the approach fits G1 students very well as they have 100% rate of agree or strongly agree to Q1, which is due to the familiarity with the scenario, user requirements and the initial design as well as feedback provided after evaluating the initial POS user interface.

To study students' learning experience a questionnaire was used. Figure 4 outlines the survey questions and students' opinion regarding the learning experience.

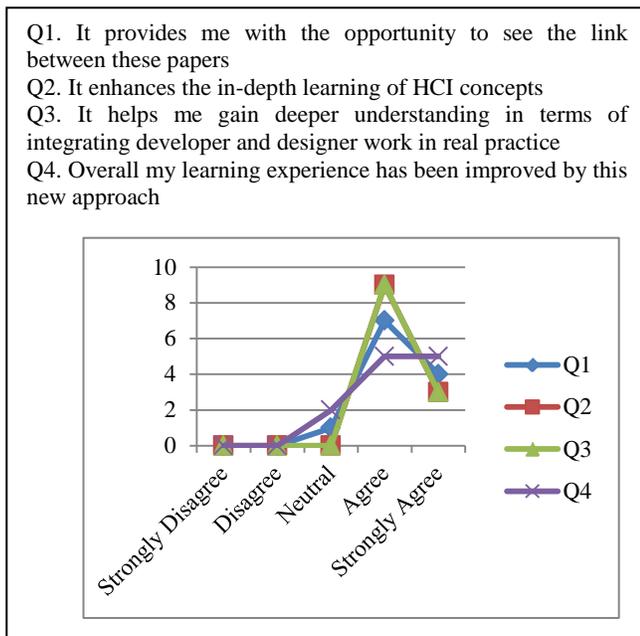


Figure 4. Students' opinions of learning experience

As shown in Figure 4, 100% of students agree or strongly agree that this approach to assessments provided them with the opportunity to observe the connection between papers and enhance in-depth learning. In addition, 100% of G1 students reported that they believe this approach improved the outcome of the live project, which can possibly establish a foundation for lifetime learning.

In addition, 92% of participants recommended this approach be implemented for other papers. One student did not answer this question. They suggested some other papers that could be associated through assessments such as:

- Object Oriented Programming and Application Development
- Database and Application Development
- Application Development and Testing

## 5. CONCLUSION

This paper explores the implications of applying integrated assessment on students' workload and their learning experience.

From the data collected and systematic observation of the students' reaction to this assessment approach, it was found that using integrated assessment, while teaching associated papers such as Application Development and Human Computer Interaction topics, is an effective approach to reducing course workload. In addition, the students also indicated that the assessment method implemented in this study encourages in-depth learning, supports lifetime learning, and motivates students to clearly see the association between components of study.

From an academic viewpoint, students should be assessed using a wide range of assessment approaches within their program of study. The approach used in this study encourages students' self assessment practice as students need to review the initial design and identify areas of improvement. It also encourages reflective assessment with peers, and inspires students to use comments provided on initial design to influence further learning.

This approach to implementing integrated assessment could overcome concerns reported by students [12], such as students' confusion as they tried to identify which sections in the assessment belongs to each paper. In this approach the students get one scenario and user requirements and two different marking criteria each of them associated with the learning outcome of different papers, this will also assure students that failing to perform well in one assessment will not influence the results of the other paper.

For future work, the effect of integrated assessment on workload perception within a larger group of participants will be investigated, further exploration will be conducted to understand whether using repeated case study for assessment had an impact to enhance in-depth of learning, in addition I will try to implement and evaluate this approach in a class setting when all students are enrolled for the two papers at the same time. Then the current results will be compared with the future results in terms of workload perception and learning experience. In addition, this approach could be adapted to other papers where there is a clear association between the learning outcomes of the related papers and a suitable class setting that supports implementation.

## 6. ACKNOWLEDGMENTS

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