Using PeerWise to Knowledge Build and Consolidate Knowledge in Nursing Education

Johanna Rhodes
Nursing Educator
Southern Institute of Technology
Abstract

This paper describes a quantitative research study which hypothesised that “Using PeerWise provided opportunities for knowledge building and consolidating knowledge for Nursing Students in the third year of their Bachelor of Nursing programme at the Southern Institute of Technology”. PeerWise is an on-line repository of multiple choice questions that educators and students create, and share. The 2012 year three Bachelor of Nursing cohort accessed PeerWise from February 2012 until November 2012 and this was linked to the clinical paper ‘Nursing in the Acute Setting’, a 30 credit paper in the Bachelor of Nursing curriculum. This study used manifest content analysis and the results suggested that PeerWise had provided opportunities for knowledge building and consolidating understanding.

Keywords

PeerWise; Nursing Education; Teaching Methods; E-Learning; Multiple-Choice Examination

Background

The Nursing Council of New Zealand (2012) directed that the ‘transition to practice’ paper in the third year of the Bachelor of Nursing programme include 360 clinical hours. Prior to this directive, this paper offered 200 clinical hours. This directive necessitated a removal of 80 hours, and consequently the previously offered on-site revision paper was retired from the Bachelor of Nursing curriculum at the Southern Institute of Technology for 2012.

This window of opportunity enabled the researcher to provide year three nursing students with a learning tool to enhance revision for their final examination ‘State Finals’. The Nursing Council of New Zealand sets the State Final Examination and Nursing Students are required to sit and pass this examination to obtain registration as a Registered Nurse (they are then able to practice in New Zealand as a Registered Nurse (RN) under the Health Practitioners Competency Assurance Act (2003)).

The State Final Examination comprises two 90-minute examinations with 180 multiple-choice questions in total. The examination is separated into topics and candidates are required to achieve a passing percentage in each area (the pass mark is determined annually by the Nursing Council of New Zealand). The multiple choice questions are based on scenarios that are taken from the clinical settings (Acute, Medical, Primary Health, and Mental Health). The researcher identified that PeerWise potentially offered the opportunity for the students to continuously knowledge build and revise throughout 2012 in preparation for their State Final Examination.

PeerWise is an on-line repository of multiple-choice questions that are created, answered, rated, and discussed by educators and students. Typically, at the beginning of a semester, a course using PeerWise begins with an empty repository, which grows gradually as the course progresses (Denny, Luxton-Reilly & Hamer, 2008).
Literature Review

A shift of significance from the focus of teaching to learning is explored by Barr and Tagg (1995) in their inspirational contribution to the learning canon. They discussed that for many Nursing Educators the learning paradigm has always existed but delivering all the elements of this takes a conscious effort. The example Barr and Tagg provided is the circular response to teaching that many Nursing Educators have adopted in their delivery of education. Barr and Tagg suggested that Nursing Educators identify an area of weakness of students and then respond by teaching or re-teaching the material, arguably removing the responsibility of learning from the student to the educator who feels a pressure to ensure learning has occurred by re-teaching material. Fear, Doberneck, Robinson, Fear, Barr, Van Den Berg, Smith, and Petrulis (2003) further explored Barr and Tagg’s narrative suggesting that Barr and Tagg stimulated the spread of learner-centred education providing a scope for education in the tertiary sector (nursing) to move from a dominant paradigm involving educator driven information to a learning paradigm which is student driven education.

Self-directed learning is a process in which individuals take the initiative by formulating learning goals and evaluating learning outcomes (Knowles, 1975). Nursing education is a profession of changing technologies and nurses need to respond to change and take responsibility for their education (Lasater, 2011). Therefore, Nursing Educators have adopted the growing trend of preparing students for continuing education by implementing self-directed teaching methods into their facilitation of undergraduate education. In contrast, Taylor and Bedford (2004) and Levett-Jones (2005) suggested that the majority of undergraduate students express a strong preference for an educator-centred approach.

The benefits of self-directed learning are acknowledged in literature. However, the success of implementing self-directed aspects into the curriculum is dependent on the educator and student preparation (Foley, 2000). One particular teaching method is e-learning which Smart and Cappel (2006) suggested could improve the quality of learning by providing access to resources while enabling exchanges and collaboration between students and educators. PeerWise is a web-based system that supports the creation of student-generated test banks of multiple choice questions. Students contribute question stems and answers, provide explanations, and answer questions contributed by other students, the students also have the opportunity to rate questions for difficulty and quality (Denny, Luxton-Reilly, & Hamer, 2008).

PeerWise is able to accept images and attachments which provides further opportunity for visual questions rather than written. However, PeerWise is limited to multiple-choice questions. Leung, Mok, and Wong (2008) discussed the use of multiple-choice questions being commonly used in nursing education as this assessment method allows a large amount of material to be assessed in a short period. However, Watkins, (1982); Ramsden (2003) in earlier articles proposed that the increasing use of multiple-choice questions potentially could encourage students to surface learn rather than employing a deeper learning approach which other assessment methods promote. Schuwirth and van der Vleuten (2003) and Leung, Mok et al contested Watkins and Ramsden’s proposals, suggesting that when multiple-choice questions are well constructed potentially an assessment of higher order cognitive domains occurs.
Cowan, Norman, and Coopamah, (2005); Redfern, Norman, Calman, Watson, and Murrells, (2002) expressed that there is considerable debate about the concept of knowledge versus competence in nursing education particularly in relation to assessment. In order to ensure a national standard of assessment the Nursing Council of New Zealand sets a national state final examination for Nursing Graduates who have completed their undergraduate nursing degree. Therefore, integrating the web based e-learning tool of PeerWise into an undergraduate nursing curriculum has the potential to provide an opportunity for students to practice multiple-choice questions using a self-directed approach as the students have to create multiple-choice questions for PeerWise. Alongside the creation of the questions students have the opportunity to answer other student’s questions (anonymous) to enable the collection of questions to enlarge and provide the student with knowledge building opportunities and revision towards their Nursing Council of New Zealand state final examination. In this manner an e-community of learners is promoted and developed, consistent with sound educational best practice.

The Research Process

Descriptive Research
This study used a quantitative research method within the conceptual framework of descriptive research. Burns and Grove (2009) proposed that descriptive research “provides an accurate portrayal or account of characteristics of a particular individual, event, or group in real life situations for the purpose of discovering new meaning, describing what exists, determining the frequency with which something occurs, and categorizing information” (pg. 766). Johnson and Webber (2005) suggested that the exploration and interpretation of current human concerns and practices provide the data required to direct changes to systems and organisations.

Burns and Grove (2009) contended that quantitative research methods generate statistics that allow for the organisation of data in ways that give meaning and insight into the frequency of the variables with the study phenomenon. Therefore, this study was a descriptive, exploratory study using a survey technique in the form of a questionnaire.

The Study Sample
Students at the Southern Institute of Technology are invited to complete an evaluation (template provided by the Southern Institute of Technology) at the completion of each paper in the Bachelor of Nursing Programme. In addition to this evaluation educators are invited to create their own evaluation tools specific to the content of their particular paper to enable professional development, change to papers, and evidence to support proposed changes. This study’s questionnaire was created to gather data specific to the use of PeerWise which was used for the first time in Nursing Education at the Southern Institute of Technology with the hypothesis that this web based programme had provided knowledge building and consolidation opportunities for the Nursing Students. An evaluation time is scheduled into the students’ timetables and the data for this study was collected during this time.

The Southern Institute of Technology’s policy is to offer all enrolled students the opportunity to evaluate the papers in the Bachelor of Nursing programme; however, their participation is not compulsory.
An Information Sheet about the study was provided to each student one week prior to their completing the questionnaire (November 2012). Each potential participant was advised they would be required to complete a written consent form prior to the collection of data. This was emailed together with the Information Sheet to each potential participant to enable the students to read and understand what was being asked of them and the rationale for this. In addition, copies of the Information Sheet and Consent Form were available to the students on the day of the data collection.

**Sample Size**
For this research study, it was necessary to consider a sample size that represented the sample frame and that was large enough to generate valid and reliable data. The number of potential participants was 38 students. The number of students who choose to participate in this research study was 32.

**Data Collection Method and Analysis**
The use of a survey technique in the form of a questionnaire is recognised by Burns and Grove (2009) as a desirable and expedient instrument to collect data relating to an identified population or to a phenomenon of interest. The questionnaire was developed using two categories (Knowledge Building and Consolidating Understanding).

A five point Likert scale in a matrix format was used to measure the participant’s responses to the closed questions. The participants were provided with the alternative responses of strongly agree, somewhat agree, neither agree or disagree, somewhat disagree, and strongly disagree. The use of the Likert scale in this research study allowed for a range of responses, and also provided a measurement of direction and intensity of the participant’s beliefs and opinions.

Manifest content analysis was viewed as an appropriate tool by which to analyse the questionnaire data. The strength of this tool was situated in its deductive ability to generate statistical evidence by measuring the incidence of recurrent descriptors within the predetermined framework of categories.

The questionnaire data was organised into a predetermined framework consisting of two categories. Microsoft Excel was selected as an appropriate software programme to use in the analysis of the data. The decision to use this programme was based on the simple statistical approach chosen and the ease of application. Data preparation was conducted prior to analysis. This involved data entry that was manually entered into the Excel worksheet. Data cleaning was achieved by printing the data file and comparing it with the original data source, this provided an insurance of accuracy of all data entered in the data file. The Excel programme generated statistical analysis in the form of percentage indicators to measure the frequency of recurrent descriptors within the predetermined framework of categories. Graphs were used to create visual effect to present the findings. Latent content analysis was utilised following statistical analysis of the questionnaire data to identifying emerging concepts from the findings which formed the conclusions and recommendations from this study.

**Ethical Considerations**
Ethical approval was received by ethical committees from both the University of Otago and the Southern Institute of Technology for this study. No funding was received from any external source for this study.
Results

The first questionnaire asked the student to evaluate if PeerWise had provided them with an opportunity to knowledge build during their third year of the Bachelor of Nursing Programme. This section was broken into six questions as seen in Table One. The students were instructed to circle or tick their response.

Table One: Knowledge Building

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Somewhat Agree</th>
<th>Neither Agree Or Disagree</th>
<th>Somewhat Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing an original question on a particular topic developed my knowledge about what I knew about a topic</td>
<td>Strongly Agree</td>
<td>Somewhat Agree</td>
<td>Neither Agree Or Disagree</td>
<td>Somewhat Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>Developing an original question on a particular topic enabled me to identify “gaps” in my knowledge</td>
<td>Strongly Agree</td>
<td>Somewhat Agree</td>
<td>Neither Agree Or Disagree</td>
<td>Somewhat Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>Providing a rationale for each answer developed my knowledge about what I knew about a topic</td>
<td>Strongly Agree</td>
<td>Somewhat Agree</td>
<td>Neither Agree Or Disagree</td>
<td>Somewhat Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>Answering other students/educator questions developed my knowledge about what I knew about a topic</td>
<td>Strongly Agree</td>
<td>Somewhat Agree</td>
<td>Neither Agree Or Disagree</td>
<td>Somewhat Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>Answering other students/educator questions helped me identify “gaps” in my own knowledge</td>
<td>Strongly Agree</td>
<td>Somewhat Agree</td>
<td>Neither Agree Or Disagree</td>
<td>Somewhat Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>The rationale provided for each question created by other students/educator provided me with direction for further knowledge building</td>
<td>Strongly Agree</td>
<td>Somewhat Agree</td>
<td>Neither Agree Or Disagree</td>
<td>Somewhat Disagree</td>
<td>Strongly Disagree</td>
</tr>
</tbody>
</table>

The results are shown in Graph One:

Graph One: Knowledge Building
The results suggested that PeerWise had provided the students with an opportunity to knowledge build during the third year of their Bachelor of Nursing Programme. This was shown by the high percentage of responses in the strongly agree and somewhat agree opinion. Not all students developed questions as this was optional (but strongly encouraged), which could explain the neutral response to question one (‘Developing an original question on a particular topic developed my knowledge about what I knew about a topic?’) by 6.25% of students. The student’s participation on PeerWise was voluntary and while statistics of participation are able to be obtained from PeerWise (by the educator), this information was not collated to establish if the 6.25% of students who responded to question one neutrally were the students who did not contribute questions. This was essentially due to the anonymous nature of this research. However, the results from question two (‘Developing an original question on a particular topic enabled me to identify ‘gaps’ in my knowledge?’) contradicted this result as a lower percentage of student’s opinions were neutral for this.

Providing a rationale for each answer appears to be a pivotal strength of PeerWise with the students’ opinions being dominant in the strongly agree and somewhat agree opinions. In addition, the dominance of the students’ opinions of strongly agree and somewhat agree further supported strengths of using the PeerWise programme with the students’ opinions supporting that PeerWise had provided them with developing knowledge about what they knew about a topic, identifying gaps in their knowledge, and using the provided rationale for each answer enabled direction for further knowledge building.

A modest percentage of students remained neutral in their opinion to answering if other student/educator questions had helped them identify ‘gaps’ in their own knowledge. However, none of students remained neutral with the questions related to developing knowledge and direction for further knowledge building. This may suggest that ‘gaps’ in knowledge are not always identified by students, but rather recognising what they do know and how to build on this knowledge is more effective for the students’ learning process.

The second questionnaire asked the student to evaluate if PeerWise had provided them with an opportunity to consolidate their knowledge during their third year of the Bachelor of Nursing Programme. This section was broken into four questions as shown in Table Three:

**Table Three: Consolidating Knowledge**

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Somewhat Agree</th>
<th>Neither Agree or Disagree</th>
<th>Somewhat Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Answering other student’s/educator’s questions helped reinforce what I knew about the topic and consolidated my understanding</td>
<td>Strongly Agree</td>
<td>Somewhat Agree</td>
<td>Neither Agree or Disagree</td>
<td>Somewhat Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>I found the process of developing original questions to be a useful activity which assisted me with consolidating my knowledge</td>
<td>Strongly Agree</td>
<td>Somewhat Agree</td>
<td>Neither Agree or Disagree</td>
<td>Somewhat Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>I found the process of providing rationales for the answers to my questions assisted me with consolidating my knowledge</td>
<td>Strongly Agree</td>
<td>Somewhat Agree</td>
<td>Neither Agree or Disagree</td>
<td>Somewhat Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>I would like to use this strategy again in the future for knowledge building and consolidation of knowledge</td>
<td>Strongly Agree</td>
<td>Somewhat Agree</td>
<td>Neither Agree or Disagree</td>
<td>Somewhat Disagree</td>
<td>Strongly Disagree</td>
</tr>
</tbody>
</table>
The results are shown in Graph Two:

**Graph Two: Consolidating Knowledge**

The results supported the hypothesis that PeerWise had provided the students with an opportunity to consolidate their knowledge during the third year of their Bachelor of Nursing Programme. This was shown by the dominant percentage in the strongly agree and somewhat agree opinions. The question related to the process of developing original questions to be a useful activity which assisted the student with consolidating their knowledge and the process of providing rationales for the answers to their questions assisted the student with consolidating their knowledge showed a percentage (9.36% each question) of neutral responses. These responses could be consistent with the students who choose not to contribute questions to PeerWise.

The dominant (90.63%) strongly agree opinion to ‘Would the student like to use PeerWise again for knowledge building and consolidation of knowledge’ suggests that this programme was useful for the students. As this web based programme is not part of the students’ enrolment at the Southern Institute of Technology the possibility of them using PeerWise in the future is strong and as a result of this finding the graduating students continue to have access to this resource. A small percentage of students remained neutral in their response to this question.

An incidental finding of this study was that all students enrolled in ‘Nursing in the Acute Setting’ class (N = 44) had attempted the pre-session questions placed on PeerWise one week prior to the timetabled simulated session, and it was evident to the researcher that significant reading had occurred when the students attended these sessions. Many students verbally stated how they found this method interesting and “better” than having to do “lots of reading”. As this finding was not part of the study the researcher has ‘shelved’ this finding but considers that further investigation is indicated.
Limitations

Limitations of this study include the limited sample size of 32 students, further studies would need to occur to support or disprove these findings. A supplementary limitation is that the participants in this study had all successfully achieved their Bachelor of Nursing degree; it is potentially possible that the students who had not achieved this qualification may well have responded differently. The data from non-achieving students could potentially signpost further support and resources that may well be correlated with increased success rates in the Bachelor of Nursing programme.

Another potential limitation is that PeerWise, as a consequence of its structural uninhibited access may, temporarily, contain questions whose content is no longer contemporary or accurate and or rationale for answers that is also inaccurate. However, with PeerWise being a student and educator learning tool the educator can maintain vigilance on each question and rationale posed to correct inaccuracies. Moreover, each question has an associated comment thread so that other students can critique, and provide corrections to the questions. So it is likely that some of these questions will be corrected by the author’s peers. As an educator it is important when using PeerWise to set the students’ expectations so that they realise the resource is peer-generated, and therefore there are no guarantees that all content they will encounter is perfectly correct. They should be encouraged to be critical and make their own judgments, based on feedback they receive within PeerWise, such as how other students have answered the questions, how the questions have been rated, and what comments have been written, which potentially advances critical thought and judgment using a resource where the students remain anonymous.

Conclusion and Recommendations

The results from this study strongly supported the hypothesis that PeerWise had provided knowledge building and consolidation opportunities for the year three Bachelor of Nursing students at the Southern Institute of Technology. The dominance of the students’ opinions being strongly agree and somewhat agree provided evidence that the 2012 cohort of third year nursing students found that using the on-line tool PeerWise had provided them with the opportunity to develop knowledge and revise this throughout 2012 leading up to sitting of the Nursing Council of New Zealand State Final Examination.

The incidental finding that all the students enrolled in ‘Nursing in the Acute Setting’ class had attempted the pre-session questions was significant. Many students verbally stated that they preferred this method of pre-learning, and felt better prepared when they attended the on-site timetabled taught and simulated learning sessions.

The recommendations from this study are to promote the use of PeerWise as a formative assessment. This research indicates that PeerWise is supported by students who consider this tool a potent learning method that provides a versatile opportunity to build and consolidate knowledge. This is consistent with the concept of a formative assessment. Formative assessment is described by Durers and Brown (2009) as an assessment for learning, with summative assessment being an assessment of learning. Quinn (2001) asserted that educational providers should consider formative assessment as being integral to effective teaching and learning due to its potential to improve student achievement. Moreover, the
researcher intends to explore the incidental finding of the students preference of using PeerWise as a pre-session tool rather than directed pre-reading.

This study will be replicated at the conclusion of 2013 to enable a comparison of results between two cohorts of relatively similar Bachelor of Nursing students. PeerWise is an innovative, and grounded educational strategy well suited to the educational learning styles of contemporary and e-savvy nursing learners. It is a tributary of significance to the river of e-learning. PeerWise is strongly aligned to the educational paradigm shift espoused by Barr and Tagg (1995) in their ground breaking transformational narrative which altered the focus of education from teaching to learning. Contemporary teaching and learning now demands a vision from educators to retain relevance, and PeerWise optimises a unique e-learning portal. PeerWise is characterised by versatility as it engages the learner with the process and content of autonomous decolonised informed student determined learning. This study provided feedback from students that support the utility and collaborative learning potential of PeerWise. With regard to the future of educational e-learning there is no roadmap and predicting the path ahead will not be easy, however PeerWise is tailor-made to optimise the potential of the learner determined knowledge.
References


