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Does reflective practice enhance clinical competency in Medical imaging undergraduates?

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Abstract

Reflection enables the interpretation of processes in order to learn from such experiences. A study was designed to determine the level of reflective thinking and its influence on clinical competency assessments. Level of reflection between year three and four students was not significant (p<0.21) however clinical competencies and students’ reflection level before and after intervention showed significant difference (p<0.05). The agreement between lecturers evaluation on student competencies (k=0.611) was high. Overall, the study showed that reflective practice promotes the development of clinical competencies in medical imaging undergraduates and provides the pathway for readiness in professional practice.

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Keywords: Clinical competency; medical imaging; reflective thinking; reflective practice; undergraduates

1. Introduction

Reflection in education has been gaining prominence in professional education as true learning occurs only after one has been through a learning experience (Karen et al., 2007). The purpose of reflecting on practice, according to Johns (1997) is to enable interpretation of a process or experience. Reflective practice can be defined as the process of turning thoughtful practice into a potential learning situation (Kember et al., 2000). There are three types of reflection: reflection before action; reflection in action; reflection on action (Hall, 1995).

Reflection is a form of mental processing that we use to fulfill a purpose or to achieve anticipated outcome. It is applied to gain a better understanding of relatively complicated or unstructured ideas and is largely based on the reprocessing of knowledge, understanding and possibly emotions that we already possess. Educators assert that the emergence of reflective practice is part of a change that acknowledges the need for students to act and to think professionally as an integral part of learning throughout their courses of study, integrating theory and practice from...
the outset (Mann et al., 2007). Therefore, many medical imaging educators are striving to develop educational activities to promote reflective thinking and practice to prepare graduates to address reflective judgment questions. Due to the amount of core curriculum content and requirements to meet national radiography accreditation standards, educators are limited in the amount of time they can devote to provoking ill-defined questions in the classroom. However clinical education may create the appropriate environment to foster reflective thinking and practice.

Reflective thinking is important for functioning in changing situations, for refreshing knowledge and to solve complex problems. This enables private understanding and devises new strategies of action and to solve ill-structured problems (Moon, 1999). Metacognitive reflection focus on helping educators develop awareness of thought in students so that they can take control of their thinking processes (Tan & Goh, 2008). Reflective action assists professionals to become equipped and competent in critical thinking, problem-solving and conceptualized understanding as required in a working environment.

Besides, reflective action involves re-assessment of an action of the problem or situation; reflective habits include ‘reflection’, and ‘critical reflection’. When engaged in reflection, learners assess their learning experience to evaluate their actions for future improvement, as well as consider various possibilities as solutions to problems. However, it is only when learners bring into question the beliefs which underlie their chosen paths of action, or the knowledge and ideas which seem to be widely accepted, that critical reflection is demonstrated. Hence this is deemed the most profound level of reflection and may therefore not be frequently observed (Kember et al., 2000); moreover, other related research suggests that critical reflection may happen in stages and not all at once (Thorpe, 2004).

As research on reflective practice is dispersed across several health professions, the present study was specifically designed to determine the level of reflective thinking and its influence on clinical competency in medical imaging undergraduates.

2. Methods

This cross-sectional interventional study was divided to a pre and post: survey on reflective thinking and clinical competency assessments that promotes reflection. Data collection commenced after approval from the institutional ethics committee. Informed consent was also obtained from each student prior to the study.

The questionnaire was obtained from a previous study and adapted for this study requirements, with use of Cronbach’s alpha validity and reliability test (Kember et al., 2000). The questionnaire comprised of 16 items that categorized students into four level of reflective thinking: habitual action, understanding, reflection and critical reflection as shown in Table 1 (Mezirow, 1997).

<table>
<thead>
<tr>
<th>Habitual action</th>
<th>the learner engages in activity that is routinely and frequently conducted with little conscious thought.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding</td>
<td>the learner acts to comprehend and apply knowledge within contextual constraints, and without recognizing personal significance</td>
</tr>
<tr>
<td>Reflection</td>
<td>the learner assesses the problem-solving process and uses this to make reflection.</td>
</tr>
<tr>
<td>Critical reflection</td>
<td>decisions about what is the best way to approach the problem, but without re-assessing assumptions on which beliefs are based.</td>
</tr>
</tbody>
</table>

How do these levels of reflection relate to clinical competencies? Clinical practice requires students to reflect in different ways which may trigger cognitive conflict, thereby providing the spark for reflective thought (Savery & Duffy, 1995).

The initial survey on level of reflection was done on 64 students who were third and final year students. Clinical competency assessment was done using objective based clinical evaluation on final year undergraduates and
Self and lecturer evaluation was done using a 16 criterion structured evaluation. Intervention was implemented on all students by providing information and related activities on reflective practice. A second clinical competency assessment was scheduled followed by a post evaluation survey on reflective thinking.

Descriptive statistics which included group means and standard deviations were carried out. The level of agreement within the two lecturers and students' scores was determined by using Kappa. A comparison of pre and post intervention of student on reflective practice was done using Wilcoxon Signed Ranked statistical analysis.

3. Results

Sixty four (N=64) students completed the questionnaire while 34 among these students participated in both clinical competency assessment. The 64 students were categorized as 31% male and 69% female from three different ethnicity: 58% Malays, 39% Chinese and 3.1% from other ethnicity as shown in Figure 1 and Figure 2.

![Figure 1. Gender of students](image_url)

![Figure 2. Race of students](image_url)

Analysis of the questionnaire was done by summing the four items comprising each scale. Table 2 shows the mean and standard deviations and p-value for each of the scale. Mann-Whitney U analysis showed no statistical
difference ($p < 0.21$) between the level of reflective thinking in third and final year undergraduates, however descriptive analysis showed a slight increase in the mean value of reflective thinking in final year students.

Table 2. Mean, SD and $p$-value of each scale

<table>
<thead>
<tr>
<th>Scale</th>
<th>Mean (SD) 3rd Year</th>
<th>Mean (SD) 4th Year</th>
<th>$p$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitual Action</td>
<td>12.03 (2.785)</td>
<td>11.26 (3.136)</td>
<td>0.296</td>
</tr>
<tr>
<td>Understanding</td>
<td>15.33 (3.457)</td>
<td>15.88 (2.837)</td>
<td>0.748</td>
</tr>
<tr>
<td>Reflection</td>
<td>14.33 (2.998)</td>
<td>15.24 (2.924)</td>
<td>0.131</td>
</tr>
<tr>
<td>Critical Reflection</td>
<td>13.97 (2.646)</td>
<td>14.64 (2.695)</td>
<td>0.189</td>
</tr>
</tbody>
</table>

The clinical competency assessment showed a high degree of agreement ($k=0.611$) between the lecturers and a moderate agreement between lecturer and undergraduate self evaluation ($k=0.484$). Therefore based on Kappa test, the lecturers scores showed reliability in the evaluation process and undergraduates scores showed an ability to relate and reflect in clinical practice without any biasness.

There was evidence of a significant difference ($p < 0.05$) in the clinical competency assessment of the undergraduates before and after intervention as shown in Figure 3 due to an improved understanding which results in enhanced practice. Similarly, Wilcoxon Signed Ranked test showed significant difference ($p < 0.05$) in the students reflection level before and after intervention.

4. Discussion

The current study is in agreement with Kember et al. (2000) which reported no significant difference in reflective thinking and course year, ideally advancement from one year to the other should experience an increase in reflective thinking. The clinical competency assessments were done using objective based clinical assessment on four competencies in radiography: communication, decision making, performance and film analysis which is the requirement of an entry level radiographer. The ability to self assess is dependent upon the ability to reflect effectively in one's own practice (Lisa, 2009). Intervention was done to improve their reflective skill in workshops, case study presentations and on simulation (Mann et al., 2007). This study is also in agreement with previous studies as acquiring the knowledge of rethinking back their experiences and connecting them with what they learned in
theory would develop their reflective practice (Yuen, 2009). A learner is a passive recipient of received knowledge and that learning through activity engages all of our senses as done by the intervention seminar in this study (Hallet, 1997).

5. Conclusion

The level of reflective thinking did not increase significantly as undergraduates move up from each course year. It is possible to promote reflective thinking and practice from lecturer guided activities. Overall, reflective practice does promote the development of clinical competency in medical imaging undergraduates. Limitation to the study is a small sample size which is controlled by the intake numbers in a course year.

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References


