

PROJECT TITLE: PEER-ASSISTED LEARNING AS A STRATEGY TO IMPROVE SKILLS AND COMPETENCIES ACQUIRED DURING WORKPLACE LEARNING IN RADIOGRAPHY TRAINING

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AIM OF THE PROJECT

This research project was the third cycle of a bigger action research project in the Department of Clinical Science (DoCS) at the Central University of Technology (CUT) with a focus on student support during clinical training. Therefore, the students who participated were already introduced to the concept of Peer-assisted Learning (PAL) in selected modules in the programme in cycles 1 (first year) and 2 (second year) of the project. Hence they knew the dynamics of being divided into peer groups (tutees) working with appointed tutors on structured activities which are focused on addressing the areas where improvement is needed to enhance their performance in upcoming assessments. This cycle of the project **aimed to** investigate PAL as a strategy to improve the skills and competencies students acquire during workplace learning (WPL) in radiography training.

As with the previous two cycles of this project, the aim of this cycle was achieved as the sampled students performed better in three of the six identified at-risk competencies after the PAL interventions. After having solicited the students' experience after engaging with PAL, the majority of students reported a positive experience for most of the questions in a quantitative questionnaire survey.

Noteworthy is that the change that was brought about for the students who engaged in the PAL intervention in this cycle, and also in the previous two cycles, did not only increase their assessment performance but was also assisted with the development of their soft skills such as study methods, time management, information access, self-esteem, etc. to address the inequalities between students from privileged and disadvantaged backgrounds towards social justice for all the students.

METHODOLOGY

The design of this research was based on action research. Action research is described as an initiative to address an immediate challenge or as a reflective process of progressive problem-solving. Action research in the educational environment can be beneficial since it can combine the use of different research designs such as descriptive and exploratory designs. The process of action research is usually led by professionals working together in teams or as part of a community of practice to address issues and challenges in a specific context (O'Byrne, 2016: Online).

To achieve the aim of this cycle of the project, a pre-design quantitative assessment rubric was used to measure the achievement of certain skills and competencies during the first scheduled practical assessment in June/July 2021. Structured PAL activities were then designed to address the identified challenging areas. The students then engaged with these activities in their PAL groups working with their assigned tutor towards the improvement of their competencies/skills for the identified areas of improvement. In November 2021, the same rubric was used during the second scheduled practical assessment whereafter the

performance of the students in the identified challenging areas was compared to see if there was any improvement in the achievement of the at-risk skills and competencies. Shortly after the second practical assessment, a QuestionPro questionnaire was circulated to the students to explore their opinion about their engagement with the PAL interventions.

RESULTS AND DISCUSSION

After the first practical assessments, the researcher, with the assistance of the WIL coordinators in the programme, identified six competencies that seem to be the most challenging for the students. In other words, the competencies where most of the students have struggled to score a pass mark. Those competencies were: 1) requesting informed consent from the patient before imaging, 2) the immobilization of the patient, 3) tight collimation of the anatomical part, 4) the correct focus-image-distance (FID), 5) the correct exposure setting (kVp and mAs) for the part to be imaged and 6) image interpretation for quality. The three WIL coordinators then compiled activities focused specifically on addressing the identified challenging competencies. Some of the activities could be completed on Blackboard and some had to be completed while working in clinical practice during their WPL. The students worked on the activities in their PAL groups assisting of one tutor and three tutees. The activities were submitted to the WIL coordinators on a specified date via Blackboard or during a scheduled practical session on campus whereafter the WIL coordinator engaged in a discussion with the students on each activity.

After the second practical assessment was conducted in November/December 2021, the researcher compared the students' performances for the same six competencies against their performance during the first practical assessments to determine if the intervention was assisting the students to improve their performance.

The quantitative data was captured by the researcher and descriptively analysed by a statistician using frequencies and percentages for the categorical variables and means, and standard deviations or percentiles as appropriate for the numerical variables. The differences noted between the pre-and post-intervention results for the participating students are captured in Table 1.

TABLE 1: CHANGE IN AVERAGE RESULT FOR PRE-AND-POST PAL INTERVENTION (%) N=66

Competency	Frequency same and improvement	Per cent same and improvement	p-value
Informed consent	53	80.31	0.05865
Immobilization	49	74.24	0.1004
Collimation	56	84.85	0.0210
FID	55	83.34	0.0651
Exposure setting	53	80.30	0.0383
Image interpretation	54	81.82	<.0001

The students showed the most significant improvement in their skill to assess the acquired radiographic image for quality before it is sent through to the radiologist for reporting with a significant difference in their performance in this competency ($p < .0001$). The intervention activities that were structured to improve this competency were available on Blackboard and

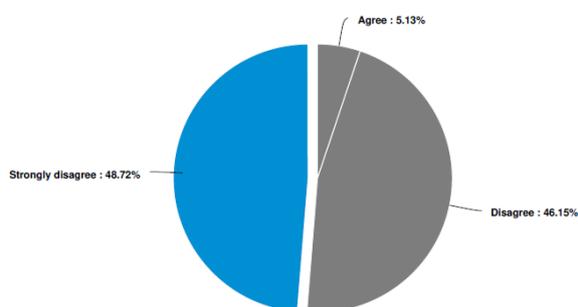
allowed the students to repeat the activity as many times as required until a final score of 90% was awarded for the activity. Students had the opportunity to engage in their groups after they have completed and submitted the first and subsequent attempts, hence allowing them to discuss and learn from each other to improve their results from one submission to the next.

Other competencies that also showed a significant performance improvement were the collimation of the image ($p=0,0210$) and the setting of the correct exposure (kVp and mAs) ($p=0.0383$). Students were allowed time during scheduled sessions in the skills laboratory on campus to work in their groups on activities structured to improve the mentioned two competencies. Activities were designed to allow the students to use the licenced simulation software, Ziltron, to practise their collimation and exposure setting skills virtually. After they have completed three activities for both collimation and exposure settings, they were required to practice their collimation skills in the x-ray room on campus while critiquing each other's collimation and exposure settings using a brief rubric for three different anatomical parts, namely the hand, the knee and the lumbar spine. This approach allowed appropriate time for the students to practice these competencies, hence allowing an improvement in their performance for the post-intervention practical assessment.

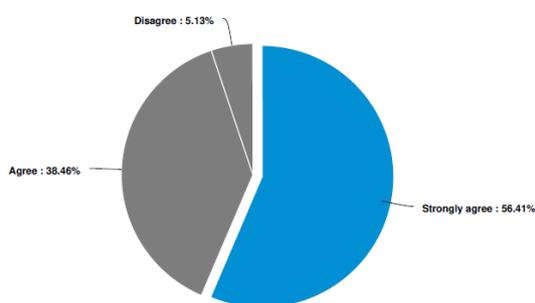
For the three other measured competencies, namely immobilization ($p=0.1004$), FID ($p=0.0651$) and informed consent ($p=0.05865$) no significant improvement was recorded. This can probably be assigned to the fact that the students have to practice these skills in real practice while performing an imaging examination on a real patient, hence allowing them limited opportunity to learn from trial and error and one another as each student is working under the supervision of a qualified professional at the accredited training facilities. In other words, less opportunity was available to practice these skills.

Some of the results from a questionnaire survey are presented below displaying the students' opinions about their experience with PAL interventions.

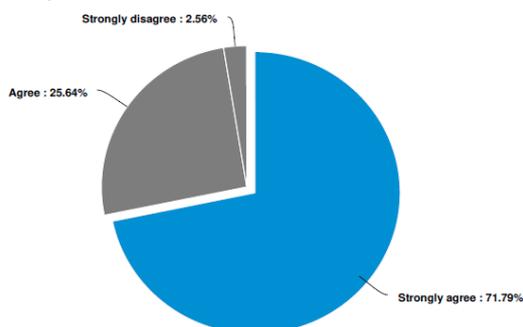
The PAL activities were a waste of time



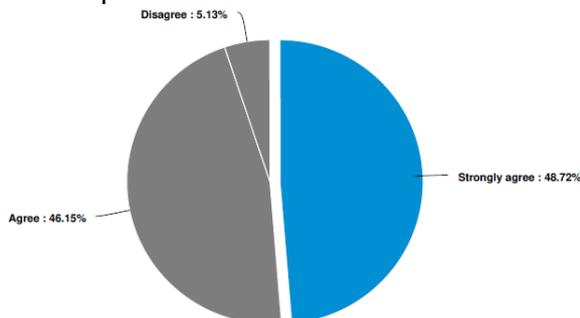
Gained useful knowledge/skills from participating in PAL



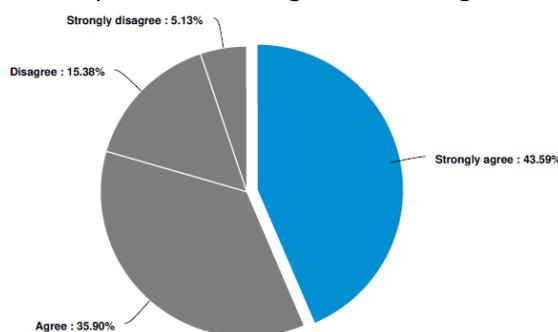
The PAL activities improved my understanding of what is required in the workplace



PAL is a good teaching method as it enhances my understanding of difficult concepts



PAL must form part of teaching and learning in all modules



As can be seen from the results presented for the questionnaire survey, the majority of students perceived PAL as a positive intervention to assist them to improve not only their assessment results but also assisting each other with other challenges to grow toward being holistic and employable professionals. PAL also proved, despite some challenges, i.e. motivating students who were reluctant to participate fully, group work dynamics and challenges for some PAL groups to work together on the PAL activities when they worked different shifts (after hours), to be beneficial to both the tutors and the tutees. Participating in PAL activities had the advantage for tutees to express learning challenges in their mother tongue, which is not always possible in the interaction between student and lecturer. The atmosphere during same-year/level PAL activities is also less tense or "mistake forgiving" and cooperative and thus facilitates cognitive closeness between tutors and tutees which, in turn, stimulates deeper learning processes in both (i.e. mutual problem-solving, reasoning skills and brain-storming).

CONCLUSION

Taking the diverse student population in South African higher education into account, there appears to be a climate of readiness to formally incorporate PAL into different areas of health education. The implementation of PAL in the classroom and during WPL is an area worthwhile exploring specifically in a South-African context. Important to note, however, is that although PAL was found to be an effective academic intervention fostering remedial action to address at-risk students' academic success in this and the previous research studies, it should not be considered a replacement for conventional teaching, irrespective of previously documented economic advantages.

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