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Stakeholders' viewpoints on work-integrated learning practices in radiography training in South Africa: Towards improvement of practice

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ABSTRACT

Purpose: The aim of this investigation was to suggest practices to improve the delivery of work-integrated learning (WIL) in radiography training in South Africa (SA).
Methods: An extensive survey was conducted among all universities in SA involved in the training of radiography students, to investigate the current delivery of WIL. Data were collected by means of quantitative questionnaires with open-ended qualitative components. The questionnaire was distributed to lecturers (n = 32), clinical supervisors (n = 44) and final-year students in Radiography (n = 146).
Results: The quantitative (closed questions) and qualitative (open-ended comments) findings from the stakeholders with regard to the improvement of practice in the delivery of WIL in radiography training are presented in this article. The main themes discussed relate to curriculum design for WIL, teaching/learning of WIL, assessment of WIL and management and coordination of WIL.
Conclusion: WIL is a powerful pedagogy if implemented and managed correctly. The results from this study may enable lecturers in radiography programmes in SA to improve the delivery of WIL in the training of high quality, employable graduates.

Introduction

Globally, universities recognise the integration of learning in different contexts as crucial to the achievement of learning outcomes and the development of skills and competencies. However, the ways in which academic learning and learning in the workplace are combined, are quite varied across universities worldwide.[1] Furthermore, many terms are used interchangeably to describe the integration of academic content with learning in the workplace, such as cooperative education, experiential learning, apprenticeships and internships,[2] which complicates a simple explanation of the true meaning of WIL.

WIL is defined as an educational strategy in which students undergo academic learning at a university, and combine this with time spent in a workplace relevant to their programme of study and career aims.[3] This definition clearly shows that the two terms, work-integrated learning and cooperative education, are used as if exactly the same concept, which accentuates the confusion caused by the variety of terms used to describe learning by doing. WIL has been described as the part of the curriculum associated with all learning activities (at the university and the workplace, also called workplace learning – WPL) aimed at preparing students for their responsibilities in the workplace upon completion of their studies.[4]

WIL plays a fundamental role in the training of healthcare professionals across a spectrum of disciplines. The main intention of WIL is that students will acquire the knowledge, skills and attitudes necessary for their future professional work.[3] However, the legitimacy of the WIL environment implies that effective training is complex and typically influenced by uncontrolled features, such as good quality teaching and assessment practices, the availability of quality supervision and mentoring of students in the workplace, and patient cases and numbers in the clinical environment.[5] Therefore, the concept of learning in the health education setting has been broadened to include activities in various settings, and the university and workplace are important learning environments to foster employable graduates for industry.[6–8] In addition to a safe patient-care environment, universities training healthcare professionals should provide a supportive educational environment.[5] However, the changing modern workplace poses challenges to

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implementing a student-centred curriculum underpinned by good WIL outcomes.[9] For instance, in medical imaging, innovations in technology are increasingly impacting on the availability of patient cases to provide students with sufficient opportunities for exposure to various imaging options. Therefore, universities are reverting progressively to other learning modes, not only in the workplace, and are increasingly using a variety of facilitation and assessment in WIL.[4]

This research involved a critical analysis of the current status of WIL in radiography training at universities in SA. Health sciences programmes generally have a required WIL component, which is regulated by the professional bodies where the outcomes achieved by students should be measurable in the clinical environment. In these professions, WPL as part of WIL is considered an important component of the curriculum. In addition to overseeing both the formal curriculum and achievement of competence, professions and state-run bodies have the responsibility of ensuring the quality of such training at the university and in the workplace. Fundamental to successful WIL is a three-way partnership between the student, workplace and university. This partnership requires that all parties accept definite responsibilities, perform specific functions, and achieve benefits resulting from the involvement.[10,11] According to Forbes,[11] the success of WIL, particularly students' WPL, is directly related to the educational management and coordination of programmes supporting the environment and allowing students to develop knowledge, competencies and attitudes to enhance their employability profile. Successful WIL depends on the meaningful interaction between stakeholders.[10,11]

This paper reports on the findings towards improvement of practice related to the current status of WIL at universities in SA, as viewed by all the stakeholders. Feedback from the different stakeholders was considered and implemented to improve practice in the delivery of WIL for radiography training in SA.

The research question guiding this investigation was: “Are the important fundamental aspects of curriculum design, teaching/learning, assessment and monitoring of WIL incorporated in the training of radiography students at universities in South Africa?”

Methods

Study design

For this study, a survey was conducted where the researcher collected data at one point in time and not over an extended period. Creswell[12] described survey research as “procedures in quantitative research in which investigators administer a survey to a sample or an entire population in order to describe the attitudes, opinions, behaviours, or characteristics of the population.” Quantitative, non-experimental information was collected by means of questionnaires consisting mainly of closed questions. To augment the information gained from the participants' responses, the questionnaire also invited free text comments which have been grouped together and reported as themes following the principles of thematic analysis.[13]

Participants

Three different questionnaires were distributed to lecturers (n = 32, response rate = 44%), clinical supervisors (n = 44, response rate = 50%) and final-year students (n = 146, response rate = 100%) at seven universities in SA. Purposive sampling was used to select lecturers and clinical supervisors, and random sampling for students.[14] Participants were identified by contacting a lecturer in Radiography at each of the universities, requesting email addresses of at least four radiography lecturers and three clinical supervisors for distribution of the electronic questionnaire. A third-year lecturer was contacted at each of the universities to arrange for distribution and collection of hardcopy questionnaires to the students during class time. The questionnaires were sent to the specific lecturers and returned by courier service.

The questionnaire

The questionnaire obtained information about the current practices in WIL from the viewpoint of the different stakeholders, pertaining to aspects such as curriculum design, teaching/learning, assessment, and management and coordination of WIL. The questionnaire format was based on a WIL benchmarking project conducted at the University of Tasmania (UTAS) in Australia,[15] and the researcher's personal experiences as WIL coordinator in a radiography programme from 2000 to 2010. The majority of questionnaire items were formulated in such a way that participants could assess their own practices as currently employed in their training programmes. The questions were designed to obtain specific information to enable comparison of current WIL practices across participating institutions.[15] To augment the information gained from the responses, participants could add open-ended comments that were used to identify shortcomings and areas for improvement in the delivery of WIL, including WPL, in radiography training in SA. A pilot study provided suggestions for improvement that were considered and applied before distribution of the final questionnaires.

Data analysis

Quantitative data from the closed questions were organised, summarised and grouped by means of descriptive statistics.[16] Qualitative data from the open-ended comments were organised in themes that mirrored the concepts covered in the questionnaire. Discussion of the results has been synchronised with the associated quantitative data to ensure consistency in reporting of the different components.

Validity of the questionnaire was enhanced by pilot testing to ensure that it accurately reflected the concept it was intended to measure.[17] Reliability was ensured by enquiring about the same aspects related to WIL at the different universities and across the groups of participants. This was done to ensure a degree of similarity of information for the data accumulated on the same concepts from different groups of participants.[18] Sending several reminders for completion and return of the questionnaires to ensure a high as possible response rate further enhanced the reliability of the results.

Results

Although many areas of good practice were identified, some of the quantitative and qualitative findings towards improvement of practice are presented in combination in this article.

Learning modes for WIL from the lecturers' perspective

The section in the questionnaire concerned with curricular design for WIL formed part only of the lecturer's questionnaire, since they were regarded as most adequately informed on this aspect. This section was designed with reference to information in legislative documentation published by the Department of Higher Education in SA. The quantitative question was formulated to assess which of the learning modes, as suggested by the Council on Higher Education (CHE) of SA in their *Work-integrated learning: good practice guide*,[19] are used by the lecturers in radiography at the

participating institutions with regard to the WIL component of their programmes. The lecturers could select from the following learning mode options: work-directed theoretical learning (WDTL), problem-based learning (PBL), scenario-based learning (SBL), project-based learning (PjBL) and WPL. The quantitative results confirmed that WPL was the most preferred mode to facilitate learning in the WIL component of radiography programmes (100%) (Fig. 1).

The qualitative comments on this question revealed confusion among some of the lecturers regarding the term 'learning mode'. All four lecturers who commented on this question failed to distinguish the term from the teaching and learning activities and assessment activities applicable to the different learning modes. Their confusion was confirmed by statements such as *learning modes are simulations and demonstrations with phantoms in a clinical setting prior to students engaging with patients in WPL.* One lecturer indicated that learning modes are *practical sessions performed on campus using the skeleton to allow students to gain skills without compromising the patient's safety.*

Assessment of WIL from the lecturers' perspective

The questionnaire for both lecturers and final-year students included a section that probed their viewpoints on the assessment of WIL. The lecturers had to respond to questions on important general aspects regarding assessment of WIL. The quantitative results for this section showed that the lecturers were mostly satisfied with the general aspects of assessment of WIL in their respective learning programmes, with scores varying from 82% to 100% (Fig. 2).

Conversely, the qualitative comments on some of the questions emphasised certain areas requiring improvement. These areas included the alignment of assessment activities with the intended outcomes for WIL and the learning modes used in WIL. For example, one lecturer reported that *the possibility exists that assessors do not pick up discrepancies in alignment when they moderate assessments in WIL (e.g. practical assessment) and that there are limitations in terms of the imaging examinations used to assess students during WPL, for example, few routine skull x-ray examinations are being done due to the fact that computed tomography (CT) is the preferred manner of examination instead.* Slight discontent with the scoring scales for rubrics as used in the WIL environment was reported, for example, *the challenge comes when assessors tend to just tick all the high scores, but this does not always give a true reflection of the learner's real competency.* Another lecturer indicated that *when radiographers assess students, they score them with very high marks, but when the university lecturers assess the students, they are much stricter and marks are lower.*

Assessment of WIL from the students' perspective

The general aspects regarding assessment of WIL in the students' questionnaire enquired about exposure to different forms of assessment, who are conducting the assessments and the frequency of assessment. The quantitative results for these questions showed that most of the students (77%) were exposed to both formative and summative assessment in the WIL component of their programmes, and 83% reported that they were assessed by both lecturers and clinical supervisors during WPL. The frequency of WIL assessment varied widely across the participating institutions (Fig. 3).

However, the qualitative comments from the students revealed areas for improvement of practice in the assessment of WIL. One student said that *there is not always alignment between the university syllabus and what is assessed in clinical practice* and that *there are too many placements for WPL for areas such as theatre, mobile units, mammography, etc., instead of areas to prepare students for assessment (e.g. general and screening).* Another student revealed that *workplace assessment expectations were sometimes not well explained* and that *clinical supervisors were sometimes not well informed regarding expectations for assessment during WPL.*

Management and coordination of WIL from the clinical supervisors' perspective

Important aspects covered in this part of the survey determined WPL clinical supervisors' involvement in the development of the WIL component of the programme, frequency of visitation of students by a lecturer, and training of clinical supervisors for their role during the WPL of the students. The quantitative results revealed that clinical supervisors were not actively involved in the development of the curriculum for WIL (50%) (Fig. 4).

This was confirmed by two clinical supervisors who pointed out respectively that *the clinical supervisors only do the practical*

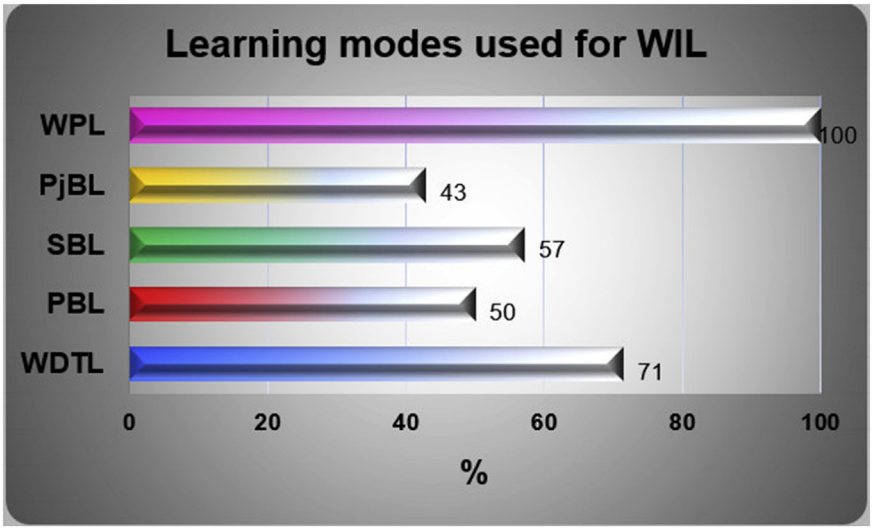

Figure 1. Learning modes used for WIL.

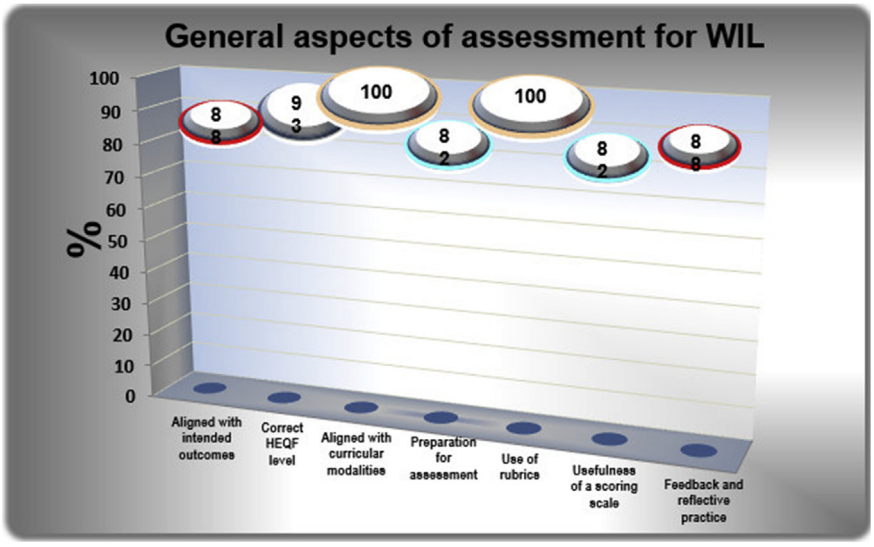

Figure 2. General aspects of assessment for WIL.

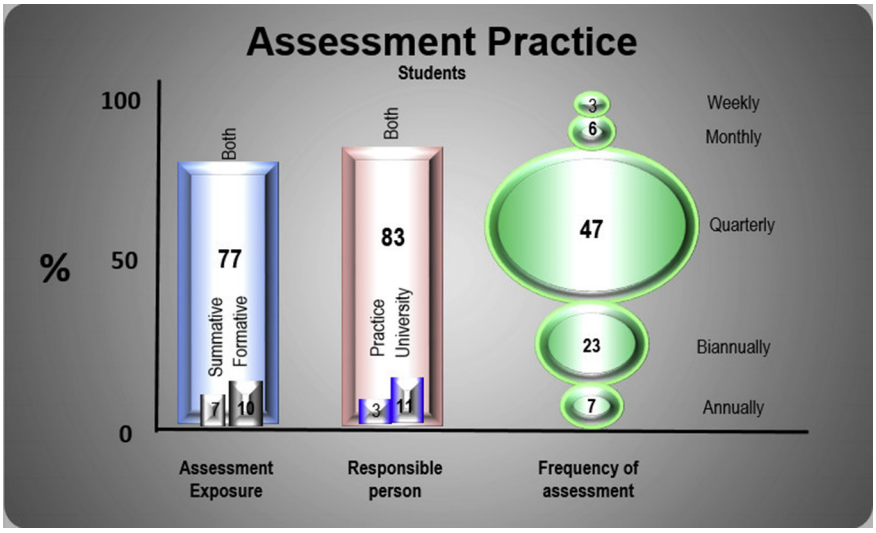

Figure 3. Assessment practice (general).

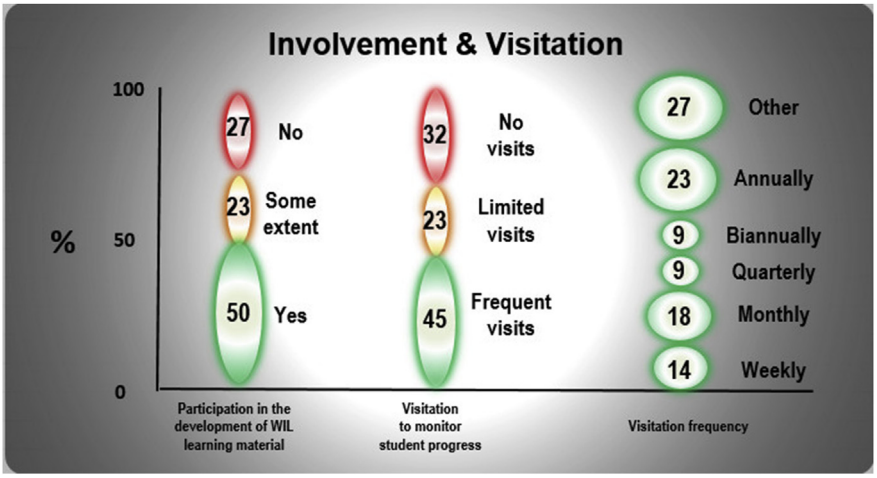

Figure 4. Involvement and visitation (clinical supervisors).

assessments since most of the planning is done by the university and *the clinical supervisors simply implement and comment and that their suggestions and proposals are taken into account, but the final WIL procedures are compiled by the university*. Conversely, one of the clinical supervisors commented that at their university, *all clinical supervisors attended an annual 2/3-day workshop where the practical training for the following year would be discussed and developed in line with the prescribed syllabus.*

The frequency of visitation of students by a lecturer varied across the participating institutions (annually = 23%, biannually and quarterly = 9%, monthly and weekly = 18% and 14%, respectively) (Fig. 4). This variation was supported by qualitative comments from a number of lecturers indicating that students are visited *three times per week; one visit at the beginning of the year; three visits in the second half of the year; only for assessment purposes;* and *only when students are in the department and the university lecturer is scheduled for a lecture or clinical session.*

The quantitative results indicated a lack of training of the clinical supervisors, with only 41% having received some training (Fig. 5). The qualitative comments reinforced this finding with one supervisor indicating that *clinical supervisors are all qualified radiographers, but very little guidance or training is given in terms of the training of students and roles are not clearly defined*. Another supervisor confirmed that at their practice *clinical supervisors don't get official training, but the university always assists whenever something is unclear.*

Management and coordination of WIL from the students' perspective

Students were satisfied with the management and coordination of WIL across the participating institutions, including aspects such as placement for WPL and communication between the university and the workplace. The only area for improvement evolving from this section in the student questionnaire, was the frequency of visitation by a lecturer when doing WPL. When the students' quantitative responses regarding the frequency of visitation was compared to the clinical supervisors' feedback, the correlation was weak ($r = 0.337$). This weak correlation resulted from the varied responses from the students and the clinical supervisors about the visitation by lecturers on a quarterly basis (students 26% and lecturers 9%), on a biannual basis (students 16% and lecturers 23%), and other frequencies of visitation (students 6% and lecturers 27%). Regrettably, no student provided any comments on this matter (Fig. 6).

Discussion

Exploring new ways to facilitate WIL

The confusion among some of the lecturers about the learning modes for WIL was disturbing. It is important to understand that WIL not only refers to the workplace as an environment where students can form links between theoretical knowledge and its application in the workplace, as was the case in the past. The concept of students being placed in the workplace to get work experience is not new. However, the rationale behind WIL goes beyond merely providing the physical environment as a site for students to experience work or learn professional practice.[19–21]

WIL can also be facilitated at university by providing a variety of learning modes, such as WDTL and PBL, and environments to ascertain formation of the necessary links between theory and its practical implementation. The workplace is only one such environment. Other environments are simulation laboratories, interactive group/forum discussions, virtual environments, and e-learning environments. An advantage is that exposing students to a variety of learning environments stimulates the development of graduate employability skills (soft skills), ensuring that they are better equipped to function in the real world of work.[21,22] Therefore, to stimulate self-directed learning and critical thinking skills,[23] the importance of using learning modes such as PBL/SBL and PjBL in the WIL environment to promote the integration of theoretical knowledge and workplace skills, has to be emphasised, and should be addressed when the WIL component of learning programmes is developed.

Embracing quality assessment of WIL

The role of clinical supervisors is paramount in the assessment of WIL.[24] In the WIL environment in radiography programmes, specifically in the assessment of WPL, more needs to be done to motivate and empower clinical supervisors for their role in the training of students. The discrepancies between the alignment of assessment activities and the outcomes for WIL should be addressed, as it was

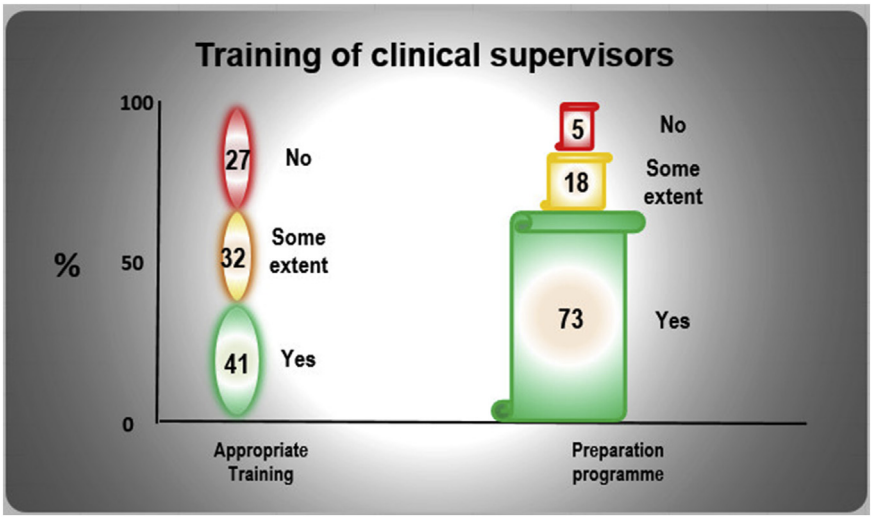

Figure 5. Training of clinical supervisors.

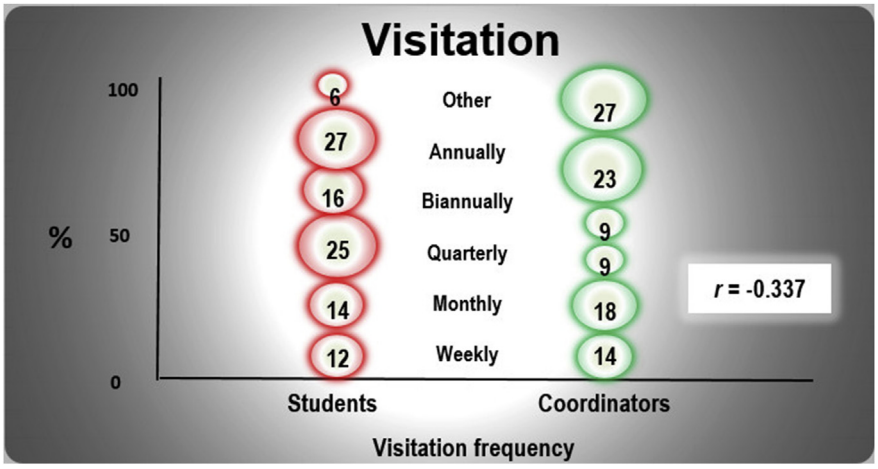

Figure 6. Comparison of visitation frequency.

mentioned by both lecturers and students as an area requiring improvement. Assessment challenges are often caused by a lack of knowledge regarding the importance of constructive alignment, because many programmes rely on the assistance of qualified professionals in clinical practice to act as supervisors and assessors for WIL. These professionals have not always received training in fundamental educational aspects such as alignment. Smith[20] advised that WIL curricula be developed to embrace constructive alignment, to ensure that students engage in integrative learning. In this manner, they will develop their ability to integrate their theoretical knowledge with practical skills and competencies. This will enable them to discern what, when and how such integrated knowledge could be applied in the world of work.

Assessment is an essential part of learning. It is a matter of grave concern that in many cases, individuals performing WPL assessments are not suitably trained. In addition to a lack of knowledge, assessors in the workplace are sometimes not well informed about expectations for assessment activities. Alignment of assessment activities with the intended outcomes can be further complicated by the unavailability of some routine x-ray examinations, such as skull radiographs, in the modern imaging environment. Thus, when placing students for WPL, the intended outcomes to be measured during assessment should be considered, in order to place students in clinical areas where they can achieve the set outcomes for specified learning areas. Again, using a variety of learning modes and environments, such as PBL and simulation laboratories, should be emphasised to address the lack of assessment opportunities and time constraints encountered in the clinical environment.

Although rubrics as grading instruments for WIL may be used with good effect, the universal problem of subjective scoring apparently has surfaced even in the WIL environment. Forbes[11] asserted that an attempt to propose a simple pass/fail system (which is often the case with rubrics), would be 'in conflict with the spirit and objectives of an outcomes-based approach to assessment'.[11] Consequently, in a system where formative feedback and a second assessment opportunity to improve performance are used, the training of assessors on the use of rubrics and how to provide good quality feedback, is of utmost importance.[21] Formative feedback is a powerful tool to enhance the learning experience and ensure that deep learning occurs. However, it is imperative that feedback should be given in a timely manner and be relevant to the shortcomings of the student. In other words, fair scoring and formative feedback should encourage the student to improve and be successful.

The clinical supervisor as the chauffeur towards success

Supervision during WPL is indispensable, especially in an environment where policies and regulations applicable to professional practice and human rights govern one's conduct towards patients.[23] It is therefore important to involve clinical supervisors in the planning of learning content, including outcomes and assessment activities.[24] Additionally, clinical supervisors should be consulted continuously about ideal placement opportunities in clinical practice to ensure the achievement of outcomes for specific learning areas. However, extensively reported in literature is the lack of proficiency of academic and clinical supervisors as one of the most serious deficiencies of WIL.[25,26] Since WIL is a powerful pedagogy that can enhance training in many health sciences programmes, the training of clinical supervisors could make WIL even more effective.[25,26] Although communication with the participating institutions in the WIL environment was not indicated as an area for improvement, ongoing and frequent communication between the university and clinical supervisors is key to the success of workplace learning as part of WIL.[25]

Frequent visitation of students while doing WPL is another aspect to ensure effective WPL.[27,28] However, many logistic factors can influence visitation and the frequency thereof, such as distances to travel, the number of training facilities accredited, and the number of lecturers concerned with WIL at the university. Although the frequency of visitation cannot be prescribed, it stimulates a culture of trust among all stakeholders in the WIL environment. Students should not report that they were never or seldom visited by a lecturer.[29,30] If frequent visitation were not possible, clear guidelines for clinical supervisors regarding student monitoring and assessment should be provided. In such circumstances proper training of clinical supervisors should actually receive increased priority over frequent visitation.[25,31]

Towards improvement of WIL practice

The following recommendations towards the improvement of WIL practices in radiography training are proposed:

- The teaching/learning and assessment of WIL should be well-planned and structured with specific focus on constructive alignment.
- To facilitate WIL, different learning environments (not only the workplace) should be recognised (e.g. skills- and computer

laboratories and e-learning platforms). The shortage of certain imaging examinations caused by the rapid development of technology, can be addressed effectively by using a learning mode other than WPL.
- Visitation by a university lecturer while the students are engaged in WPL is imperative to its success.
- Training of clinical supervisors to ensure quality training of students is urgently required, and the delivery of a structured, credit-bearing course is proposed.

Recommendations for further research

Further research is recommended to investigate specific aspects such as the training or lack thereof of clinical supervisors, the management and coordination of WIL, and the development and assessment of generic skills in the WIL environment.

Limitations of the study

Certain limitations to the study were identified. (i) Although a sufficient response rate was obtained, time constraints and a heavy workload on the part of the participating university lecturers and WPL mentors/supervisors might have impacted negatively on the return rate of the questionnaires. (ii) While the study was clearly demarcated, it became a comprehensive study, generating a large amount of data. (iii) The student sample was limited to final-year students, excluding the perceptions of first- and second-year students of WIL practices.

Conclusion

A well-planned WIL curriculum will assist students to interchange continuously between theoretical knowledge and the application of skills and competencies in clinical practice. In its intended format, WIL provides various opportunities to develop skills and integrate theory and practice. Since WIL is an ideal pedagogy to stimulate self-directed learning and develop critical thinking skills, the sound implementation of WIL in the radiography curriculum should be approached from an evidence-based educational viewpoint.

Successful WIL demands meticulous planning and co-operation between all stakeholders, including university management, lecturers, clinical supervisors and students. A lecturer with expert knowledge in the field of WIL should drive the process. An enthusiastic individual with authority, good interpersonal skills and adequate radiography experience, can play a vital role in the successful implementation of WIL. As in all teaching environments, the implementation of WIL should be a reflective and continuous process that both students and lecturers can revisit and improve on practices to achieve excellence in teaching/learning and assessment.

Conflict of interest

The author has no conflict of interest to declare.

Ethics

Written approval for the research project was obtained from the Ethics Committee of the Faculty of Health Sciences at the University of the Free State (ECUFS NR 106/2012), as well as from the Deans of the Faculties at all the higher education institutions included in the study. Participation in the study was voluntary and anonymous.

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