EXPLORING COMPETENCIES OF ENVIRONMENTAL HEALTH STUDENTS IN SOUTH AFRICA: INSIGHTS FROM WORK-INTEGRATED LEARNING

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ABSTRACT

Although the value of work-integrated learning is well documented, limited reports showcase the students' perspectives. Self-perceived competencies gained by undergraduate Environmental Health (EH) work-integrated learning (WIL) students from a University of Technology in South Africa were obtained through in-depth focus group discussions and analysis of their workplace reflection journals. The Legitimation Code Theory Specialization dimension guided the qualitative data analysis. The analysis uncovered a *tension* between current assessment criteria and tasks, professional verification and auditing criteria for workplace learning, and real-world competence norms. Exploring this tension revealed a *shift* in students' competency focus, fluctuating between conceptual knowledge for classroom success, process- and procedural skills for the professional body evaluation, and a combination of knowledge, skills and behaviours for the workplace. This *shift* reveals ambiguity, limitations and biases in current assessments favouring the assessment of knowledge and skills. Uncertainty in graduates' professional identity may further exacerbate the prevailing misconceptions about the EH profession and its contribution to public health among allied health professionals and within society. This research confirms that knowledge and skills are essential in EH practice. However, these are limited as the comprehensive competency range includes soft skills, i.e. professional behaviours consisting of attitudes and values.

Keywords: Environmental Health, Holistic, Assessment Framework, Work-Integrated Learning, Legitimation Code Theory, Specialization

INTRODUCTION

Environmental health (EH), an allied health profession in South Africa (SA), focuses on preventative health care. The EH profession's purpose is to fulfill society's constitutional right to a healthy environment, as declared in the Bill of Rights, section 24 of the Constitution of South Africa (RSA 1996). EH is a multi-faceted profession (Kuhn et al. 2021) and is subject to rapid environmental changes (Shezi et al. 2019; Morse et al. 2020). Environmental Health Practitioners (EHPs) promote societal health and well-being (ibid.; Omid et al. 2021) and implement interventions (Dhesi and Lynch 2016) to protect society. Due to them being in the "real firing line" (Walker et al. 2014, 29), when environmental issues of concern arise, they must foster inter-professional- and community relationships to advocate for improved environmental health conditions (Morse et al. 2020). Correspondingly, EHPs require extensive competencies to perform EH roles in varied contexts (Patthanaissaranukool, Fongsatitkul and Warodomrungsimun 2020). Despite their perceived role as law enforcers, they must be able to perform beyond legislative confines (Dhesi and Lynch 2016) and graduates must be proficient in practicing and achieving EH goals beyond curriculum outcomes (Omid et al. 2021).

However, for South Africa, performance standards relevant to the full competency range for EH graduates, beyond theoretical and technical outcomes, still need to be defined (Smith, Whiley and Ross 2021; Fleming et al. 2009). A focus on what students are expected to *do* rather than merely on what they are expected *to know* is needed (Chacko 2014), or students will have varying views of requirements for classroom-, professional credentialing- and workplace achievement due to tensions in performance standards.

Universities of Technology (UoTs) in South Africa include work-integrated learning (WIL) in most programmes as "a way of gaining on-the-job experience in the workplace" (CHE 2011, 78) and benefits to its role-players (Jackson 2015; Molomo 2021; Fung 2017, 84-100). Despite the benefits, a limitation presented is the WIL assessment tools and methods (Scholtz 2020; Dunn 2012). If not carefully designed and assessed, these may not reliably assess - and even miss - the intended competencies to be achieved by students (ibid.). Understanding the learning experiences of the students directly involved in WIL may enhance the entire WIL exercise as students themselves can better relate learning, competencies developed and gaps in their progress (Boud and Falchikov 2006). Von Treuer et al. (2011, 195) describe omitting recent graduates from WIL evaluation as a "neglected stakeholder". Competency can be

accumulated like "building blocks" that integrate holistic growth (Frank et al. 2010, 641). Therefore, it can also be observed, measured, and assessed.

This article presents the EH students' perspectives on the full range of professional and personal competencies gained during WIL. The research aimed to understand the comprehensive competencies acquired by EH students from a University of Technology in South Africa and its orientation on the Legitimation Code Theory (LCT) Specialization plane (Maton 2014) so that limitations of WIL assessment in the current curricula may be addressed.

Environmental Health Profession and Practitioner roles in practice

The EH practice is mandated by a professional scope outlined by the Department of Health in South Africa (DOH 2009), predominantly focusing on ensuring compliance with EH legislation relevant to reaching the EH profession's purpose. In SA, as elsewhere, there are conflicting views regarding the EHP's role in applying legislation, varying between a law-enforcement- and a developmental approach (Dhesi and Lynch 2016; Omid et al. 2021).

To navigate varied encounters, and render efficient EH services, EHPs require a comprehensive set of capabilities beyond mere knowledge and technical skills (Morse et al. 2020). This skill set comprises competencies "to perform a specific task, action or function successfully" (Frank et al. 2010, 45). For EH students, these competencies are the outcomes and indicators of the learning process and include the practitioner's dispositions (Omid et al. 2021).

Work-integrated learning (WIL) in the EH Programme

WIL is adopted by higher education institutions (HEIs) as an essential curriculum feature (Abeysekera 2006; Govender and Wait 2017). It prepares students for practice and organisational- and professional culture and promotes the development of a professional identity (Trede 2012) whilst in the workplace.

Work-integrated learning (WIL) is a compulsory part of the training of EHPs in undergraduate Environmental Health (EH) programmes offered by HEIs in SA. Figure 1 was developed to illustrate the relationship between EH WIL role-players and their roles.

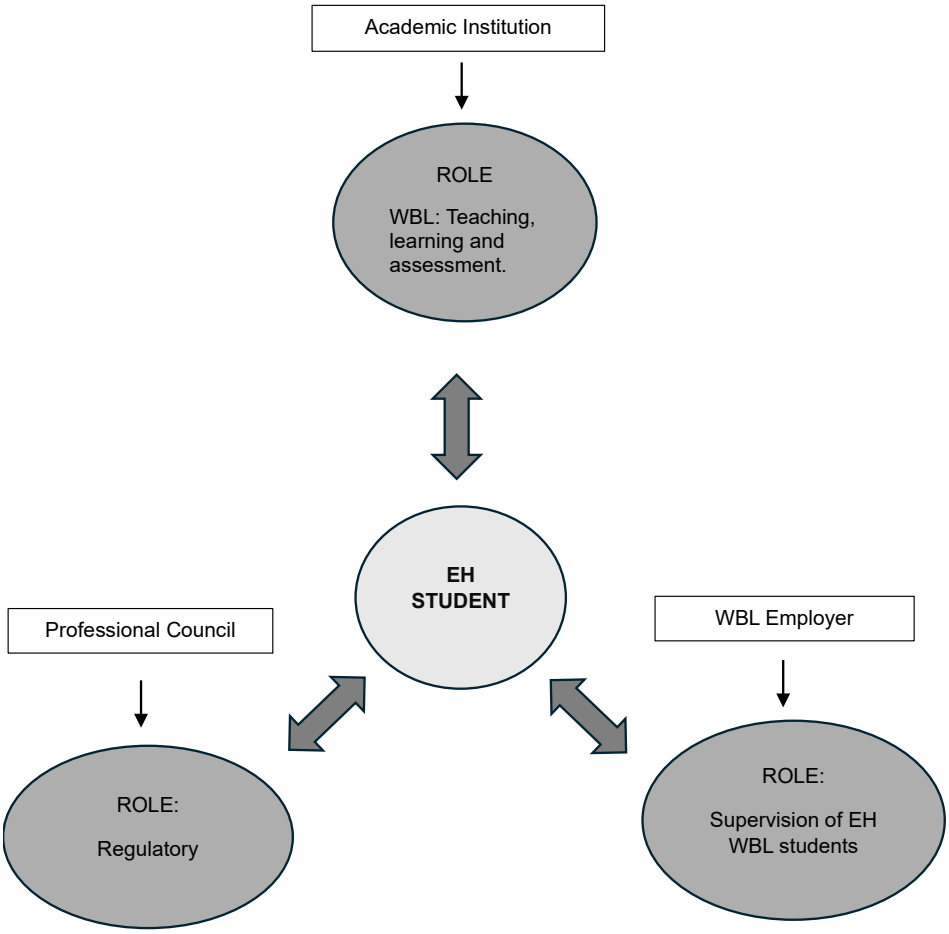

Figure 1: Role Players in Environmental Health (EH) Work-integrated learning (WIL)

EH WIL is strictly monitored and verified by its professional council, the Professional Board for Environmental Health (PBEH) of the Health Professions Council of South Africa (HPCSA). The monitoring by the professional board includes a mid-year verification of final-year students' progress toward the completion of the prescribed minimum period spent in the workplace under the supervision of an EHP, and auditing for the students' exposure to the items in the professional scope (DOH 2009) final year students' portfolios of evidence (POEs) before graduating. This is to validate that the criteria for professional credentialing, upon the completion of the EH degree, are met (HPCSA 2018).

The EH curriculum at the academic institution used as the study site has WIL embedded in its curriculum, in the modality of work placements (CHE 2011), scaffolded for varying periods during each year of study, and aligned to the technical and theoretical criteria for meeting exit-level outcomes (SAQA 2017). These aspects are assessed post-work placement through different methods. Criteria for competence beyond these need to be clearly stated in

the curriculum, and present shortcomings as the actual competencies acquired by students are not acknowledged or assessed (Scholtz 2020).

Challenges and short-comings exist across undergraduate disciplines offering WIL as part of their curricula, e.g. a lack of standardised assessment criteria and practices for workplace-based learning (Jackson et al. 2017); no assessment of holistic development of WIL beyond the technical and theoretical (Aprile and Knight 2020); a misalignment between student and employer expectations and actual competencies of the student (Herrington and Herrington 2008) and non-involvement of the central role players in the assessment of WIL, including the students themselves or their workplace supervisors (Ferns and Zegwaard 2014). The role of WIL in bridging the theory-practice gap may be lost due to tension between role players created by these limitations (Björck 2021).

Challenges and Limitations in the assessment of EH WIL competence

Environmental health (EH) training research and literature are sparse and not researched (Dhesi and Lynch 2016). The global assessment of WIL in EH programmes present a challenge, regardless of the modality. In Australia, the EH program is offered by ten institutions of higher learning, yet the approaches to WIL at the various institutions are vastly different (Dunn et al. 2018). This is the case too for the 7 HEIs in RSA offering the EH qualification programmes across SA, each with its programme structure, WIL modality and assessment method, despite monitoring by its professional council.

Following the recurriculation of EH programmes to a professional degree, the PBEH introduced a standard operating procedure (SOP) for managing WIL in HEIs in SA (HPCSA 2018). Despite this, the auditing and verification continue to centre around how WIL is managed in the programme. Therefore, the WIL assessment is partial and ignores total professional growth (Jorre de St Jorre and Oliver 2021).

A way to understand the WIL's effectiveness and contribution to competency development is to engage students in identifying, developing and evaluating their competencies based on *their* learning experiences and performance in the workplace (Boud and Falchikov 2006). These self-perceived gains are what students recognise as essential for competence and achievement, and they could use them to guide their future professional growth (Merga 2016). 2016). Ignoring these may result in antagonism between curriculum (classroom) success criteria, professional body criteria, and workplace performance criteria instead of bridging this gap, thereby missing the intention of WIL (Björck 2021).

The assessment of actual competencies developed during the work placement may require a different approach (Fung 2017). Due to the nature of EH practice (Morse et al. 2020; Dhesi and Lynch 2016), the UoT is the ideal space for training EHPs, as WIL is its distinguishing mark (Scholtz 2020). When well designed, WIL allows for the student to identify goals for their professional development, whereby the assessment of WIL competencies is student-centered and based on a process of goal-setting, evidenced progress monitoring and feedback (Frank et al. 2010) from all key WIL role-players. WIL is a key component of a competency-based approach as it offers authentic contexts for students to apply their knowledge and skills and obtain feedback from supervisors (CHE 2011. It presents an opportunity to engage EH students and supervisors to support and measure professional growth through a holistic assessment.

PROBLEM STATEMENT

Although embedded in its undergraduate curriculum, the full range of competencies relevant to achieving EH goals is vague, not fully assessed, and ignores WIL students' professional growth beyond technical and theoretical knowledge (Von Treuer et al 2011; Patthanaissaranukool et al. 2020; Bhandari et al. 2020). Legitimation Code Theory (LCT) (Maton 2014) can organise and make sense of these competencies through an appropriate LCT dimension to reduce the gap posed by the current EH WIL competency assessment. The research objectives are to: i) understand the students' perception of competencies gained during EH WIL through in-depth interviews and document analysis; ii) use the Legitimation Code Theory (LCT) Specialization dimension to guide the analysis of the competencies by way of a Specialization translation device, and iii) use the findings, as guided by LCT Specialization to inform a holistic framework for the assessment of competencies for EH WIL students.

Theoretical Framing: Legitimation Code Theory (LCT): A Guide to Frame a Holistic Assessment Framework

The theoretical framework guiding this study is Legitimation Code Theory (LCT), which flows from the works of Basil Bernstein (Bernstein 2000 In McLean et al. 2013) with a focus on structuring the significance of knowledge.

Karl Maton describes LCT as "a theoretically sophisticated but practically useful" framework that may be used to de-construct the features of knowledge practices (Amundrud 2020, 19). LCT uses specific conventions for writing and spoken presentation, and additionally

provides a set of six tools, referred to as dimensions, to observe, analyse and interpret teaching and learning practices (Pott and Wollf 2019; Ellery 2019). These dimensions may guide what is legitimated as a measure of success in teaching, learning and assessment (ibid). The LCT dimensions have proven useful in unpacking challenges in various education contexts, such as in engineering (Pott and Wolff 2019) to understand opportunities for learning and in radiography to understand the challenges involved in teaching, learning, and assessing threshold concepts necessary for practice (Hudson, Engel-Hills and Winberg 2022, 103–126). The LCT Specialization dimension was used as the lens to orientate the professional competencies, recognised as essential for success by students, i.e. legitimated by them, on a Specialization plane. This orientation (of competencies) on the plane presents as codes of legitimation (Maton and Chen 2017) and could result in it being oriented toward epistemic relations (meaning knowledge) or social relations (meaning knower disposition), by using a Specialization translation device (Maton 2014).

Learning is social context- and-student background-dependent and therefore, the actors involved may themselves provide "legitimate insight" (Maton and Chen 2017, 47). When students understand what is legitimated in teaching, learning, and assessment, they can perform accordingly and succeed (Maton and Doran 2017). Legitimation code theory (LCT) thus guided what should be legitimated as WIL achievement versus what is legitimated as EH WIL achievement from the perspective of the EH students. The orientation may be located in one of four quadrants on a Cartesian plane, resulting in one of the codes of legitimation, i.e. knowledge-, knower-, relativist or elite code, as illustrated in Figure 2.

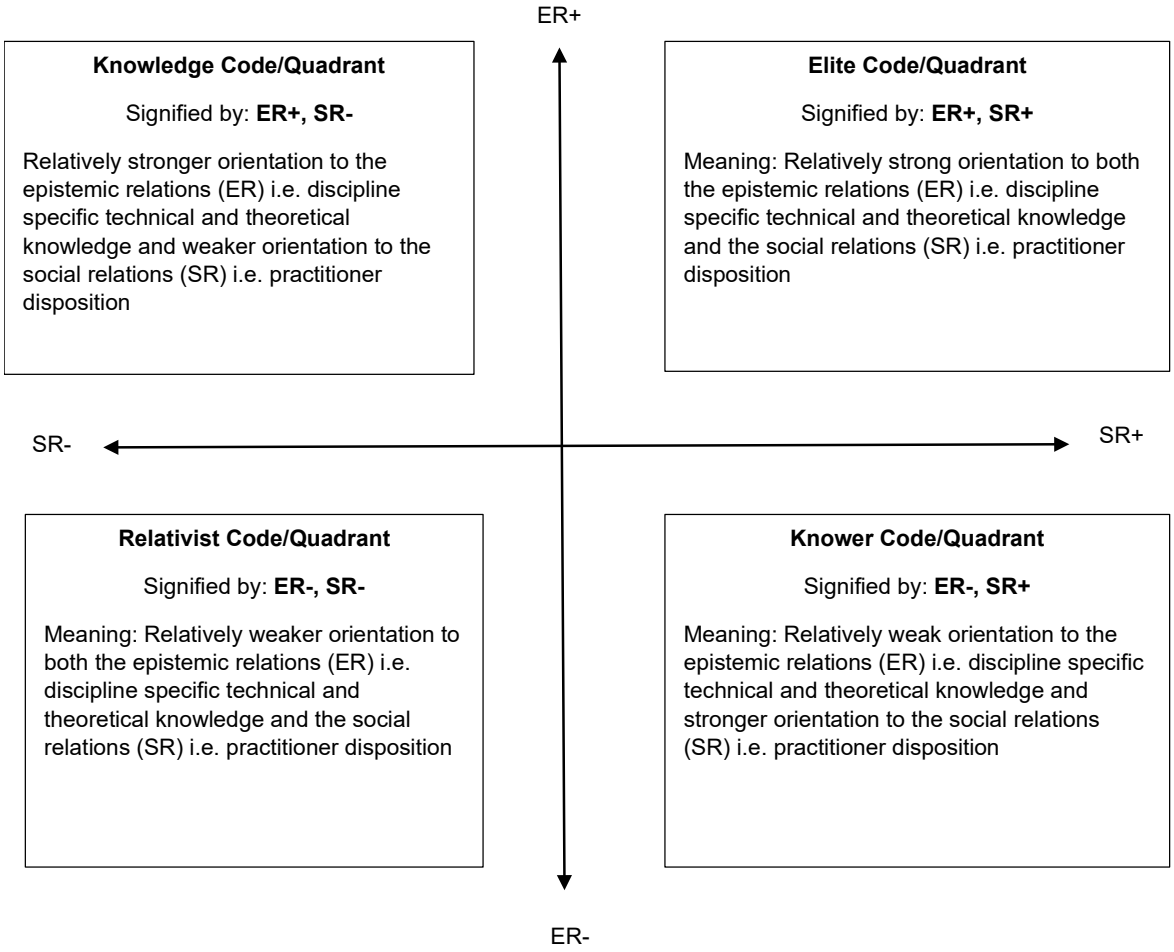

Figure 2: The LCT Specialization dimension and legitimation code descriptions (adapted from Maton 2014)

RESEARCH METHODOLOGY

Research design

A qualitative methodology, underpinned by interpretivism was best suited for this study as it yielded in-depth information about participants' experiences in a given context and rich, dense data through direct engagement with research participants (Umanailo 2019; Queirós, Faria and Almeida 2017). Interpretivism differs from a positivist approach in that the design is quantitative, the analysis is statistical, and the in-depth and nuanced experiences of the participants are not captured (Burney and Saleem 2008).

Selection of participants

Purposive population sampling included students who understood and could vividly articulate the phenomenon studied (Palinkas et al. 2015) and who completed all the WIL requirements for the EH professional degree. One cohort of senior students and one cohort of graduates had met the criteria i.e. all alumni (N=7) and all senior students (N=21). This group had sufficient exposure and experience of WIL over the four years of workplace exposure and grasped what matters and what is valued in EH practice.

Data collection

Data was collected through semi-structured interviews and document analyses of the students' WIL reflection journals. Guiding questions for the interview and document analysis were:

- What skills have you developed during your work placement?
- What knowledge have you acquired during your work placement?
- What values unfolded in you during this experience?
- What attitudes were you encouraged to develop during your work placement?

Data analysis

The Atlas.ti 9 software (ATLAS.ti Scientific Software Development GmbH, 2021) was used for the initial organising and transcribing of data as it can handle audio recordings and large volumes of textual data.

Data from interviews and documents were analysed by thematic content analyses (Braun and Clarke 2006). Audio-recorded data was first transcribed, and then iteratively interpreted to determine and map patterns from recurring data (Saldanha 2016, 58–246). Following this was open, inductive coding, focused categorisation, and descriptive and interpretive coding (ibid.), informing final codes and themes (Braun and Clarke, 2006). Meaningful information relevant to the study objectives was extracted through textual analysis.

A Specialization translation device was developed to "enable productive dialogue between data and theory" (Maton and Chen 2017, 27). This translation device served as the lens through which the data was analysed, and the emerging themes were plotted on the Specialization plane. The Specialization plane presents a continuum of strengths, from stronger to weaker, in its relation to the epistemic relations (ER) or the social relations (SR). Thus, a competence, i.e. emerging theme, would always have both an epistemic relation as well as a social relation, but vary in its relative strength to the ER and or SR, i.e. could have a stronger (+ or ++) or weaker

(- or - -) relation to the ER or SR. The participants used qualifying words, phrases, tones, or nuances to express emphasis. These emphasising expressions aided in determining the strength of a theme toward either ER or SR. It was, therefore, necessary to adapt the translation device to capture the emphasis in its different forms, as less than one-third of participants have English as a first language.

The LCT Specialization dimension provided the basis of analysis to ascertain whether the competencies gained by the participants are stronger (+) or weaker (-) in its epistemic relations (ER) or social relations (SR), to both or neither. It was anticipated that the outcomes would inform criteria and guide the competence assessment in EH WIL, thereby reducing limitations in current assessment practices and making it holistic rather than replacing them.

Table 1 presents an example of the Specialization translation device and how it was applied to the data.

Table 1: Specialization Translation Device with examples of its application to the data collected.

RELATIONSHIP STRENGTH	**EPISTEMIC RELATIONS (ER)**		**SOCIAL RELATIONS (SR)**	
	Relative strength about an identified competency	**Examples of self-perceived competencies from the data and its relative strength toward the epistemic relations**	**Relative strength about an identified competency**	**Examples of self-perceived competencies from the data and its relative strength toward the social relations**
Strengthening relations ↑	ER++: express strong emphasis, e.g. vital, crucial, very important or essential	"…it is **crucial** to check inside the fridge because they always have a lot of bodies to keep and therefore, they might be storing one on top of the other." (RJ_SS6)	SR++: to express strong emphasis, e.g. vital, crucial, very important or essential	"Number one is respect towards people …the public, the members of the public ….. as well as your colleagues." (SS1))
	ER+ : express importance but not a strong emphasis, e.g. important, required, favoured or valued.	"I would say when it comes to the legislation, …I could actually see how to apply that knowledge … and why it is **necessary** to know the legislation" (SS5)	SR+: express importance but not strong emphasis, e.g. important, required, favoured or valued.	"Professionalism goes a long way. Therefore, you must be professional." (AL1)

	ER-: Express no emphasis, e.g. trivial, no role or not relevant	"It is important that someone has this kind of qualities because it's **not really about the knowledge**; it's about the type of person that you are. (SS13)	SR-: Express no emphasis, e.g. trivial, no role or not relevant	"…an EHP without knowledge, I don't think is a good idea; people out there will challenge you…" (SS6)
Weakening relations	ER--: express strong down-play, e.g. not needed at all, does not matter or plays no role	"…legislation is **not a big issue**… legislation is not cast in stone…it changes all the time based on new knowledge being developed" (AL6)	SR--: Express strong down-play, e.g. not needed at all, does not matter or plays no role	"I think the most important knowledge that I've gained is from the legislation because they outline our scope of practice … they act as a guidance in order for us to execute the job correctly." (SS11)

Ethical considerations

Verbal and written informed consent were obtained before the commencement of each interview. Participants could withdraw from the interview at any point during or after the interview.

For document analysis, consent was obtained from the relevant faculty at the UoT (Ethical clearance ref. no. 189045701/11/2021) to gain access to the students' documents and to conduct interviews with those enrolled at the UoT at the time of data collection. Individual verbal and written informed consent were obtained from the rest of the participants not enrolled at the time of data collection, i.e. alums.

Due to the presence of personal identifiers, e.g. in statements commonly used by a participant in everyday speech, audio recordings will not be shared. The anonymized data transcripts may be shared via the UoT's data repositories and the restrictions in the data management plan will be observed.

The study focussed only on the EH professional degree programme at one UoT, focusing only on work placement in municipalities.

Quality assurance and rigour

Researcher positionality is considered a limitation in qualitative research (Holmes 2020) due to the researcher's context-dependent and inter-changeable role. As the WIL coordinator of the EH programme at the UoT under study, i.e. research site, the researcher became aware of the system-related challenges relevant to WIL in the EH undergraduate programme.

Working closely with the participants in this position may have created a benefit due to an existing rapport with participants. Being aware of this potential bias, the researcher remained flexible and avoided informant bias by abandoning information irrelevant to the study (Chavez 2008) and using identical probes where participants assumed the researcher understood the depth of their experience (Dwyer and Buckle 2009). Understanding the biases helped the researcher to mitigate them by being flexible (Morse et al. 2002), giving neutral responses to irrelevant responses (Clarke 2006), and practicing ongoing researcher reflexivity to circumvent them (Holmes 2020; Chammas 2020). The researcher remained conscious of changing perspectives, positions, and relationships with the study (Holmes 2020), taking a position in the "space" between the role of insider and researcher (Dwyer and Buckle 2009).

The semi-structured interview guide was piloted to ensure clarity and dependability of questions, consistency in depth-soliciting prompts, and time for the interview. A process of iteratively checking data, moving back and forth through data interpretations (Morse et al. 2002) was done. Participant ideas were corroborated through summarised feedback of responses during interviews and member-checking for accuracy. Peer review was done through debriefing and debate with research supervisors to ensure credibility, confirmability, and dependability (Lincoln and Guba 1985, In Morse et al. 2002). A "data collection form" was used to guide and organise the document analysis data into categories and describe the themes.

Accuracy was maintained by traversing between the document and transcript analyses to obtain clarity where sufficient detail was required to answer the specific research questions. Bowen (2009) suggests this is useful for corroboration of information obtained from the interviews and the documents.

FINDINGS and DISCUSSION

A total of 21 participants, consisting of 15 senior students (SS) and six alumni (AL), were interviewed, and their WIL reflection journals (RJ) were analysed. Codes were assigned to anonymize each participant and their respective documents.

Thematic Framework

As guided by Braun and Clark (2006) and from the data analysis, the themes derived are knowledge, skills, and professional behaviours, the latter having values and attitudes as sub-themes.

Using LCT Specialization to orient current assessment of competence in the EH programme

The LCT Specialization dimension was the tool that was used to establish the current assessment focus of both the EH curriculum and the PBEH verification and auditing orientation on the plane. The current assessments, as per the curriculum document (SAQA 2017) are stronger in their epistemic relations (ER++) than the social relations (SR-). Therefore, the assessment focus is located in the *knower* quadrant of the Specialization plane. It assesses theoretical and technical knowledge as part of curriculum exit level outcomes- and scope of practice exposure perspective.

The standard operating procedure (SOP) for the management of WIL in the EH undergraduate programme by the credentialing body (HPCSA 2018) is relatively weak in its orientation toward epistemic relations (ER- -) and social relations (SR - -). The PBEH WIL verification tool (PBEH 2022, email message to author, 25 May 2022) focuses on WIL administration in the EH programme, placing it in a *relativist* quadrant as neither knowledge- nor knower code is emphasised.

The self-perceived competencies gained by students during WIL, as per the analysis results, are relatively strong in their orientation to both the epistemic relations (ER++) and the social relations (SR++) and are located in the elite quadrant of the Specialization plane. These are described and discussed further in this article. Figure 3 illustrates the *tension* uncovered by the LCT analysis and the *shift* in the focus of EH students' competencies depending on context.

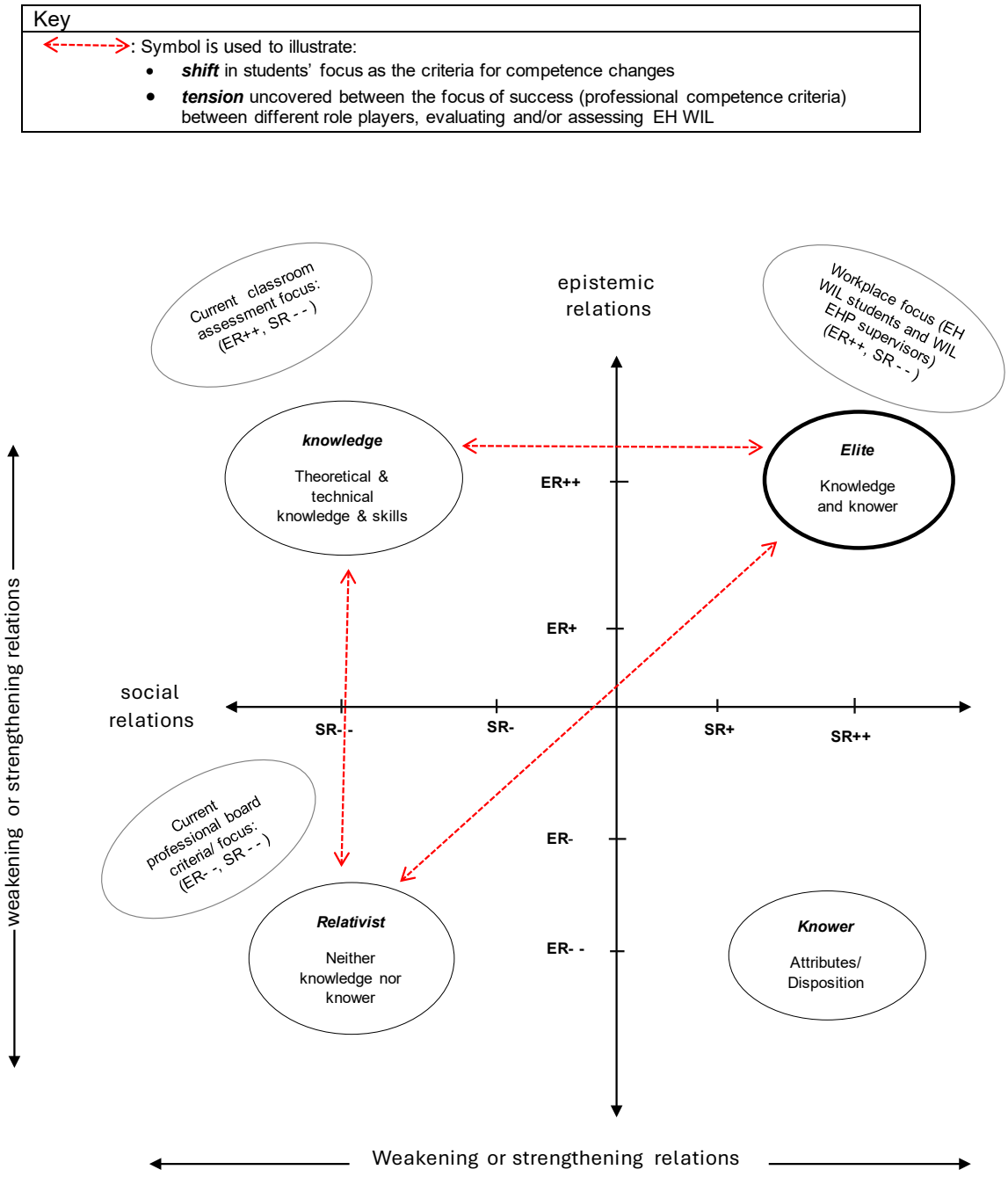

Figure 3: Diagram illustrating tensions between role players and shifts in EH WIL students' competency focus

LCT Specialization orientation of EH students' perceived competencies gained during WIL (as illustrated in Figure 3)

Knowledge (Conceptual)

This theme centres around the "what", i.e. "conceptual knowledge", defined as factual information (Schmidmaier et al. 2013), i.e. the technical and theoretical knowledge necessary for EH practice. This knowledge supports the processes and procedures to perform practice-related work tasks (Franz et al. 2022). Participants emphasised conceptual knowledge as "very important to have" (AL4) and described lacking this as "meaningless" (SS1) to the EH profession. They related that being in the workplace enhanced their understanding of using conceptual knowledge in EH practice.

Two participants felt that too much theoretical content is imparted in the classroom: "There's way more stuff that we learn out in the classroom" (SS8) and that it is "totally different from what is practiced in the workplace" (SS9).

Participants shared that knowing and understanding the EH legislation, such as the scope of practice and EHP roles are essential in EH practice. This was described as "more important" (SS14) than other knowledge, and that "You must know your legislation before you can actually do your work" (AL2). They equated knowing the legislation to being a competent EHP, as explained by one participant: "When you know your legislation, you would really be an [sic] competent environmental health practitioner" (SS4).

Despite this emphasis on knowledge, many participants however, felt that applying knowledge of the legislation and the professional scope requires a "soft approach" (AL4) as EH practice "deals 100 per cent with people" (AL6) both inside the organisation and within society. Participants thus recognised the practitioner's disposition in enacting mandated duties and roles. Participants are acutely aware of the powers and authority assigned to the EHP but view the EHP's role as one of uplifting the community and promoting health and well-being:

> "…(you) shouldn't put that on your mindset that you have the power to close them down. Just have a positive attitude and try to help them so that they may comply, rather than to enforce, enforce and acting all big and all that." (SS13)

Possessing conceptual knowledge of various EH legislation and its contents was foregrounded and emphasised as crucial for competence, but so too was the disposition of the EHP. Thus, the epistemic relations are relatively stronger than the social relations in this context and are illustrated as ER++, SR+ on the LCT Specialization plane.

Although emphasised by the participants, conceptual knowledge cannot solely solve "wicked problems" of EH, meaning issues that cannot be solved by a "true or false" solution

but rather by a "good or bad" approach (Stewart et al. 2023,156). This approach requires a set of capabilities (Whiley et al. 2019), such as the disposition of the EHP, the possession and extent of their soft skills, and social- and relationship skills to achieve the outcomes of legislation. Thus, conceptual knowledge alone, such as legislation application and enforcement, cannot solely be used for problem-solving in EH practice (Schmidmaier et al. 2013). Others support this notion that EHPs do not merely perform within legislative confines, such as in Australia (Dhesi and Lynch 2016), a misconception that exists even within the organisations in which EHPs operate (Smith et al. 2021).

Additionally, as EH issues vary from one geographic location to the next, EH's "wicked problems" require the complementary skills of other disciplines within the organisation (Stewart et al. 2023). Thus, relationship skills and fostering cooperation amongst clients and inter-departmentally to achieve desired health outcomes are necessary for EHP competence. In doing so, the complete competency set of the EHP can be better utilised and supplemented (ibid.) to solve EH problems. This aspect depends on the attributes and disposition of the individual and is discussed further in this section. Emphasizing knowledge and technical skill in the training of EHPs may result in a practitioner being unable to reach EH goals. Identifying and addressing these gaps in undergraduates may eliminate the space between classroom and workplace, as was the case in an engineering undergraduate programme (Pott and Wolff 2019), thereby enhancing employability and meeting employer requirements. Criteria for knowledge assessment are present and explicit in the EH curricula, but not so for practitioner dispositions. Re-design of the WIL to include the knower disposition in teaching, learning, and assessment is thus necessary.

Skills: process and procedural

This theme describes the practice-related procedures, actions, and processes applied in EH. Processes are the actions taken to achieve an outcome, while procedures are the specific instructions or steps to complete the task (Nguyen 2020). For example, the EHP must perform the Food Control (DOH 2009) function as a process. The procedures to achieve this include, amongst others, taking food samples following steps prescribed by legislation (DOH 2018) and conducting food premises inspections.

Participants explained that being in the workplace enhanced their understanding of EH practice by giving them "more of an idea of what you're going to be doing exactly" (AL4). This

includes which “steps and procedures to follow in the performance of functions”, related as “one of the pre-requisites” (SS9) “to execute the job correctly” (SS11).

Conceptual knowledge helps students to understand these processes and procedures applied in practice. This finding is supported by studies exploring the benefits of WIL (Jackson 2015; Smith 2012; Björck 2021)

Participants repeated that having the skills to enact the technical work requires specific soft skills, as one participant explained:

> "how you handle yourself, how you approach people, how you interact with them, and how you communicate with them is more important than your knowledge, because you can go and tell someone all your knowledge, but as long as you are not presenting yourself good enough to them, they are not going to listen to you, so it's just a waste of time" (SS12).

Participants, therefore, highlighted interpersonal communication skills as a significant requirement for competently executing EH duties. They described this skill as “one of the main abilities… strengths that you have to have” (SS7). Being capable of effective interpersonal verbal communication is regarded as “the key” (SS1, SS15) to (practice) environmental health and is regarded as “extremely important” (SS9). Participants foregrounded communication abilities as integral to EH practice, thus having strong epistemic relations and strong social relations, i.e. ER++, SR++ on the Specialization plane.

Criteria for process and procedural skills are explicit in the EH undergraduate curriculum, but not for the practitioner attributes underpinning these. Using the workplace – an authentic context – for its assessment will enhance the development of this skill, and its assessment validity (Ajjawi et al. 2020).

Behaviours: Values and Attitudes

In the study context, behaviour is how participants interact with others in the workplace. Behaviour in the workplace is underpinned by the disposition of the individual, which is comprised of attitudes and values deemed appropriate in the performance of EH duties. Thus, attitude describes how participants feel or think about the EH profession. Attitudes are underpinned by values, i.e. personal – and professional principles of behaviour such as confidence, humility, being approachable, and managing conflict, and together, these inform behaviour. Values subscribed to are informed by personal beliefs that participants either possessed before, developed during WIL, or that were enhanced by WIL. Emotional

intelligence (EI) underpins behaviour and is the ability to recognise the emotions of oneself and others and to act accordingly (Gribble, Ladyshewsky and Parsons 2017).

The data informs that emotional intelligence (EI), and its various traits inform and direct behaviours. Figure 4 was developed to illustrate the relationship between the aspects influencing behaviours, such as beliefs, values, and attitudes, as well as the underpinning role of EI.

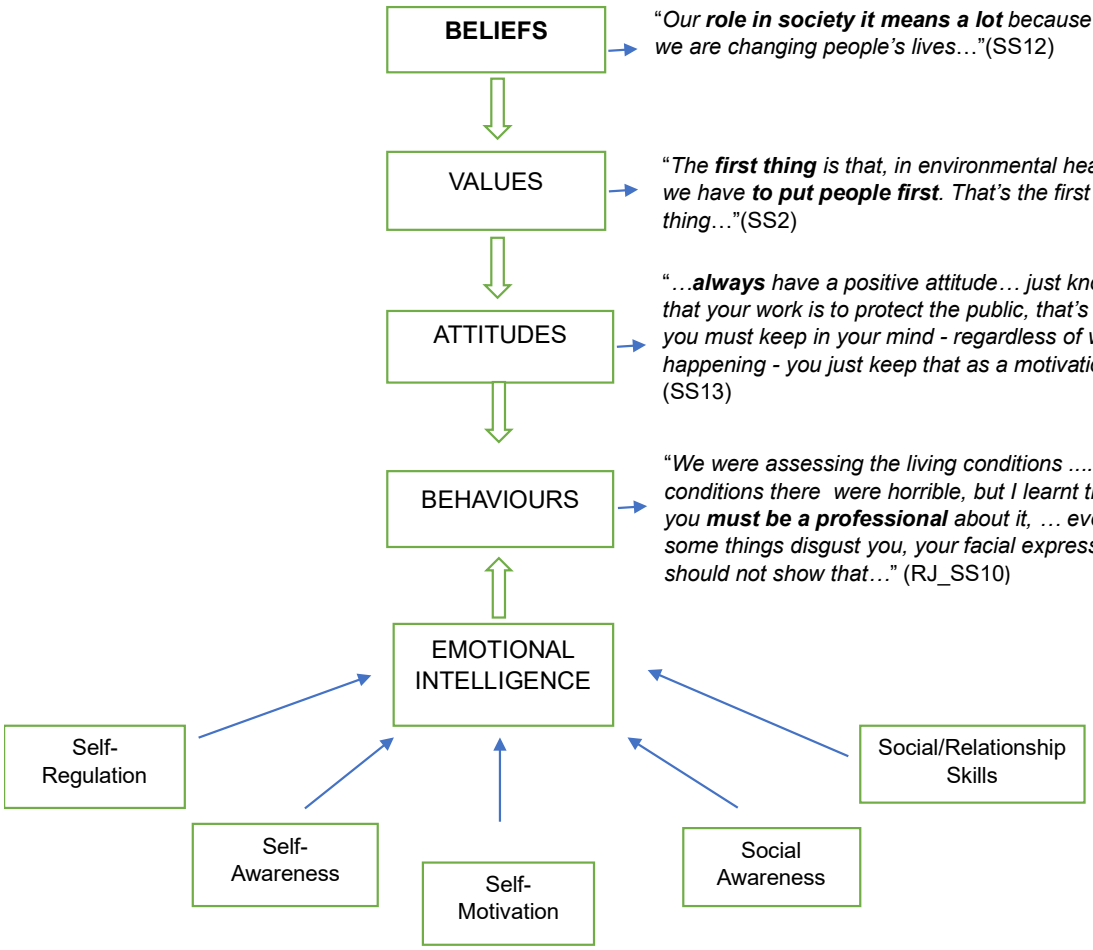

Figure 4: Relationship between professional and personal values, attitudes, behaviours and EI as a competency (adapted from IAA, 2015)

The emotional intelligence traits reported by participants are illustrated in Table 2 and supported by relevant examples from the data.

Table 2: Attitudes and values- relationship with emotional intelligence categories

Emotional Intelligence Trait Description (Serrat 2017)	Examples from the Data	Competence Theme and Specialization Strength of Relations
Self-awareness Emotional awareness/ Accurate self-assessment/ Self confidence	"I was so nervous because I had not answered the phone before, but I answered, and after talking on the phone, it was as if I had overcome a milestone, but it is still something I need to get used to." (RJ_SS7)	Attitude SR+/ER+
Self-regulation Self-control/ Trustworthiness/ Conscientiousness/ Adaptability/ Innovativeness	" I've realised that now, that I need to work on the patience, because of lack of patience, now, the temper then comes in as well. " (SS4)	Valued behaviour SR+/ER-
Self-motivation Achievement-driven/ Commitment/Initiative/ Optimism	" I still want to be an EHP. I want to stay being an EHP. I don't want to break out for something else; I want to be an EHP …I think the fact that we are not recognised - as much as it is demotivating - in some way, it makes you want to do more! It makes me want to make a difference so that we are recognised." (SS7)	Attitude SR++/ER- -
Social awareness Empathy/ Service orientation/ Diversity understanding and acceptance/ Developing others/ Political awareness	"…for example, I do inspection and I see a non-compliance, I can't just close down the business; it's still that person's bread and butter! So, you must be compassionate towards the next person because you don't know what his situation is about." (AL3)	Attitude, Valued behaviour SR++/ER++
Social/Relationship skills Influence/ Communication/ Leadership/ Change Agent/ Conflict management/ Building bonds/ Collaboration and cooperation/ Team Capabilities	"I feel like a warm approach works better because I've been out with other EHPs, and they just came with a more welcoming approach, just more positive, cause with a positive approach, you just get the best out of people you work with." (AL4)	Attitude, Valued behaviour SR++/ER- -

Participants described various aspects of EI required for competence in practicing EH. Table 2 describes participants' self-awareness about their strengths and short-comings; self-regulation, meaning the ability to control their own emotions, e.g. conflict de-escalation; self-motivation, as it relates to their opinion about the practice; social awareness, relevant to how their actions,

in whatever form, may affect others and social and relationship skills, relating to fostering cooperation and being able to work as part of a team.

EI traits were consistently highlighted, either as being enhanced by WIL or essential for EH practice competence. EI is an ability, personal trait, or both (Srivastava 2013). Literature suggests that having low EI may impact the ability to work independently, cope with stress and increase anxiety (Gribble et al. 2019). Possessing increased emotional intelligence traits is regarded as especially important in service-delivery practices requiring interaction with clients (Srivastava 2013). EI is considered essential for effective reciprocal communication and conflict management (Ghanbari et al. 2019; Heris and Heris 2011), attaining success in the workplace and contributing to organisational goals (Papoutsi et al. 2019), a positive work experience and attitude in the workplace (Carminati 2021) and enhancing efficiency (Lima, Spahi and Shala 2022) and teamwork (Serrat 2017). Increased EI may also impact graduate employability as it forms part of employers' desired 21st-century skills for employability (Kumar and Sharma. 2019; Tushar and Sooraksa 2023).

Despite its valuable role, including the development of EI in the curricula of many disciplines offered by HEIs needs to be improved (Gribble, Ladyshewsky and Parsons 2019; Kumar and Sharma 2019). Although some individuals may innately have higher EI than others, emotional intelligence traits can be taught and learned (Serrat 2017). Participants indeed reported that the WIL helped them develop conflict management, problem-solving, and critical thinking skills- especially during the emotionally charged events they are exposed to during their workday-, adapt to the workplace, cooperate with others, teamwork, being flexible, having empathy, being efficient and having a positive attitude towards the practice.

Behavioural competency depends on the individual's level of EI and is relatively stronger in its social relations (SR++) than its epistemic relations (ER+). Participants relate that knowledge means nothing if the EHP does not have the desired personality traits to enact it. Participants understand that knowledge is relevant and essential to EH (ER+) but requires a specific disposition to enact it in the real world of work (SR++).

Behaviour is currently not explicit in the undergraduate EH curriculum nor assessed. To best prepare undergraduate EH students for the realities of EH practice, workplace requirements beyond the technical and theoretical should be made explicit and be part of a holistic assessment of competence. Thus, it is recommended that the development of EI be made more explicit in the EH curricula by way of teaching, learning, and assessment and included as part of the full spectrum of competencies needed for success in EH practice. It should be consciously developed in the EH student and, as suggested, be scaffolded in the curricula (Heris and Heris

2011; Kumar and Sharma 2019). To reduce the mismatch between employers in EH, and other disciplines-specific educational contexts, EI capabilities must be included in curricula and consciously developed to meet 21st century employability criteria (Tushar and Sharooksa 2023). This includes a process of goal-setting, reflection, and feedback for the student during the assessment in an authentic context such as the workplace (Ajjawi et al. 2020).

Attitude

Participants reflected on how they felt about the EH practice. They felt that the EH profession needs to be recognised, and better understood, and that it is under-valued by society and other allied health professions. Despite this, participants remained optimistic about their future role as EHPs and the contribution they could make towards the well-being of society, as per the interview excerpt:

> "AL2…other professions at the Department of Health don't even know about us, and they take advantage, or they take us as nothing.
> R: Okay, and how does that make you feel about the profession?
> AL2: It makes me sad and – because I know what we do and we are important and we do…yeah… there is something positive that comes out of our work, so, even though they don't know about it it's fine! At least I know!"

Smith et al. (2021) concur with this invisibility of EH in Australia, amongst allied healthcare workers, and within the broader primary/public healthcare system. The value of the EH practice may be lost without a conscious effort to highlight the EHP's role in reaching organisational goals and community well-being (Whiley et al. 2019) due to the EHP's role being unknown to the general public" (ibid.). A basic understanding of exactly what they do, and the vital role they play in protecting public health, is lacking, as is the case for EH in North America (Gerding et al. 2019) and Australia (Dhesi 2014). Most do not understand their functions and roles beyond the confines of legislation (Dhesi and Lynch 2016) or the value added in managing health disasters (Whiley et al. 2019). Smith et al. (2021) suggest that EHPs' roles are diminished and simplified to law enforcement, and their full range of competencies and contributions to organisational goals and health protection need to be recognised. The implication is that there may be little interest in EH as a career for the future (Gerding et al. 2020).

Despite this, the positive attitude shared by participants extends to their future career plans and growth in EH practice and their contribution to societal health:

> "I've learnt that I need to always try and look at different aspects with open eyes, and try to not approach situations the same way… I still believe I made the right choice by choosing environmental health, but the next few years in the field will reinforce that..." (RJ_SS8)

Making the full range of competencies explicit in the training and assessment of EH students further strengthen the argument for establishing exactly what holistic competency criteria look like from the student's view beyond the confines of the curriculum exit-level outcomes. This view may subsequently contribute to the EH profession's promotion and recognition by society and its contribution to the broader primary healthcare goals within society (Stewart et al. 2023). The student perspective could assist in adapting the curriculum and making explicit the competencies required in the future EH professional. These may be used explicitly to promote the discipline by its professional boards, EH employers, and HEIs to train future EH professionals.

CONCLUSION

When viewed through the LCT Specialization lens, competence to practice EH is located in the *elite* quadrant, i.e. ER++ and SR++, as participants relate to gaining the combination of *knowledge* and *knower* attributes to practice EH competently. The implication is that a *code shift* is present amongst EH students across geographic regions and differing contexts, as the curriculum assessment is on knowledge and skills, and the credentialling criteria are on managing WIL in the programme, i.e. *relativist* code, without regard to competence to practice. During WIL, students recognised competency indicators, i.e., the game's actual rules, using the full range of competencies consisting of knowledge and knower attributes.

The gaps in the EH training curriculum and the associated competence assessment are not unique to South Africa. These too have been identified in the Australia (Dunn et al. 2018), the Iran (Omid et al. 2021), Thailand (Patthanaissaranukool et al. 2020) and India (Bhandari et al. 2020). A paradigm shift is suggested for all role players involved in the assessment and credentialling of EH competence. WIL, being an authentic learning context, and one in which all the discipline-specific essential professional competencies are developed and enhanced – as identified in this article – can be re-designed to address these gaps in EH curricula. As suggested by the literature and this study, the number of days spent in the workplace does not truly reflect what makes a competent EHP or graduate.

Literature suggests that competency-based assessments may require a change in the curriculum, may be time-consuming, complex to design, and should involve all parties. A

solution is an outcomes-oriented competency-based assessment Matsuzuka (2020), i.e., no change to the curriculum but adapting the WIL component to assess competency.

As competency assessment requires the involvement of all the role-players in WIL for EH students, it is suggested that information be obtained from those supervising the WIL students to determine what competencies they observe unfolding in the students as they have more time with the students during WIL than the academic(s) assessing them, and those responsible for professional credentialing. Currently, the EHP WIL supervisors are not involved in the assessment of the students' competence. This information, together with the results of the LCT Specialization analysis of this study, could provide a complete picture of the range of competencies developed in the EH WIL student and better inform a holistic assessment framework while still meeting the outcomes of the curriculum.

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REFERENCES

Ajjawi, R., J. Tai, T. L. H. Nghia, D. Boud, L. Johnson and C. J. Patrick. 2020. "Aligning assessment with the needs of work integrated learning: the challenges of authentic assessment in a complex context." *Assessment and Evaluation in Higher Education*, 45(2): 304–316. https://doi.org/10.1080/02602938.2019.1639613

Aprile, K. T., and B. A. Knight. 2020. "The WIL to Learn: Students' Perspectives on the Impact of Work-integrated Learning Placements on their Professional Readiness." *Higher Education Research & Development* 39(5): 869–882. https://doi.org/10.1080/07294360.2019.1695754

Amundrud, T., A. Inako and D. Edsall. 2020. "Looking at Knowledge and Knowers Through Legitimation Code Theory (LCT)." Interview with Professor Karl Maton. The Language Teacher, 01 September 2020, 44(5): 19–21. https://legitimationcodetheory.com/publications/database/amundrud-t-inako-a-edsall-d-2020-looking-at-knowledge-and-knowers-through-legitimation-code-theory-lct-an-interview-with-professor-karl-maton-the-language-teacher-44-5-19-21/

ATLAS.ti Scientific Software Development GmbH. (2022). ATLAS.ti (version 22.2.1) [Qualitative data analysis software]. https://atlasti.com

Bernstein, B. 2000. "Pedagogy, symbolic control and identity." In McLean, A., Abbas, A. and Ashwin, P. 2013. The use and value of Bernstein's work in studying (in) equalities in undergraduate social science education. *British Journal of Sociology of Education* 34(2): 262–280. http://dx.doi.org/10.1080/01425692.2012.710007

Bhandari, S., B. Wahl, S. Bennett, C. Y. Engineer, P. Pandey. and D. H. Peters. 2020. "Identifying Core Competencies for Practicing Public Health Professionals: Results from a Delphi Exercise in Uttar Pradesh, India." *BMC Public Health* 20(1737). https://doi.org/10.1186/s12889-020-09711-4

Björck, V. 2021. "Taking Issue with How the Work-integrated Learning Discourse Ascribes a Dualistic Meaning to Graduate Employability." *Higher Education* 82(1). https://doi.org.10.1007/s10734-020-00650-y.

Boud, D. and N. Falchikov. 2006. "Aligning Assessment with Long-term Learning." *Assessment and Evaluation in Higher Education* 31(4): 399–413. https://doi.org/10.1080/02602930600679050

Bowen, G.A. 2009. "Document Analysis as a Qualitative Research Method." *Qualitative Research Journal* 9(2): 27–40. https://doi.rog.10.3316/QRJ0902017

Braun, V. and V. Clarke. 2006. "Using thematic analysis in psychology." *Qualitative Research in Psychology* 3(2): 77–101. https://doi.org/10.1191/1478088706qp063oa

Burney, S.M.A. and H. Saleem. 2008, "Inductive and Deductive Research Approach." *Lecture delivered on 06 March 2008 at Auditorium of Faculty of Arts and Science, University of Karachi*, Karachi, *Pakistan, slides 1–22.* https://doi.org/10.13140/RG.2.2.31603.58406

Carminati, L. 2021. "Emotions, Emotion Management and Emotional Intelligence in the Workplace: Healthcare Professionals' Experience in Emotionally-Charged Situations." *Frontiers in Sociology* 6 (640384): 1–5. https://doi.org/10.3389/fsoc.2021.640384

Chacko, T.V. 2014. "Moving Toward Competency-Based Education: Challenges and the Way Forward." *Archives of Medicine and Health Sciences* 2(2): 247–253. http://doi.org/10.4103/2321-4848.144365

Chammas, G. 2020. "The Insider-Researcher Status: A Challenge for Social Work Practice Research." *The Qualitative Report* 25(2): 537–552. https://doi.org/10.46743/2160-3715/2020.3928

Chavez, C. 2008. "Conceptualising from the Inside: Advantages, Complications, and Demands on Insider Positionality." *The Qualitative Report* 13(3): 474–494. http://www.nova.edu/ssss/QR/QR13-3/chavez.pdf

Clarke, A. 2006. "Qualitative Interviewing: Encountering Ethical Issues and Challenges." *Nurse Researcher*, 13(4): 19–29. https://doi.org/10.7748/nr2006.07.13.4.19.c5987

Council on Higher Education (CHE). 2011. *Work Integrated Learning: Good Practice Guide*, *HE Monitor No. 12*. Pretoria: Ie Communications www.che.ac.za/sites/default/files/publications/Higher_Education_Monitor_12.pdf

Department of Health (DOH). 2009. *Regulations Relating to the Scope of the Profession of Environmental Health, R698/2009 (an amendment).* Pretoria: Government Printers

Department of Health (DOH). 2018. *Regulations Governing General Hygiene Requirements for Food Premises, the Transport of Food and Related Matters, R.638/2018.* Pretoria: Government Printers

Dhesi S. and Z. Lynch. 2016. "What Next for Environmental Health?" *Perspectives in Public Health* 136(4): 225–30. https://doi.org/10.1177/1757913915609946

Dunn, L., R. Nicholson, K. Ross, L. Bricknell, B. Davies, T. Hannelly, Lampard, et al. 2018. "Work-integrated Learning and Professional Accreditation Policies: An Environmental Health Higher Education Perspective." *International Journal of Work Integrated Learning* 19(2): 111–127. https://www.ijwil.org/files/IJWIL_19_2_111_127.pdf

Dunn, L., M. Shier and L. Fonseca. 2012. "An innovative multidisciplinary model for work placement assessment." *Asia Pacific Journal of Cooperative Education* 13(3): 135–145. https://www.ijwil.org/files/APJCE_13_3_135_145.pdf

Dwyer, S.C. and J. L. Buckle. 2009. "The Space Between: On Being an Insider-Outsider in Qualitative Research." *International Journal of Qualitative Methods* 8(1): 54–63. https://doi.org/10.1177/160940690900800105

Ellery, K. 2019. Congruence in Knowledge and Knower Codes: The Challenge of Enabling Learner Autonomy in a Science Foundation Course. *Alternation* 26(2): 213 – 239. https://doi.org.10.29086/2519-5476/2019/v26n2a10

Ferns, S. and K. Zegwaard. 2014. "Critical Assessment Issues in Work-integrated Learning." *Asia-Pacific Journal of Cooperative Education* 15(3): 179–188. http://hdl.handle.net/20.500.11937/37400

Fleming, M. L., E. Parker, T. Gould, and M. Service. 2009. "Educating the Public Health Workforce: Issues and Challenges." *Australia and New Zealand health policy* 6(8): 6–8. https://doi.org/10.1186/1743-8462-6-8

Frank, J. R., L. S. Snell, O. T. Cate, E. S. Holmboe, C. Carraccio, S. R. Swing, P. Harris et al. 2010. "Competency-based medical education: theory to practice." *Medical teacher* 32(8): 638–645. https://doi.org/10.3109/0142159X.2010.501190

Franz, A., S. Oberst, H. Peters, R. Berger and R. Behrend. 2022. "How Do Medical Students Learn Conceptual Knowledge? High-, Moderate- and Low-Utility Learning Techniques and Perceived Learning Difficulties." *BMC Medical Education* 22(1): 1–8. https://doi.org/10.1186/s12909-022-03283-0

Fung, D. 2017. "Connecting Academic Learning with Workplace Learning." In *Connected Curriculum for Higher Education,* edited by Timothy Matthews, 84–100. London: UCL Press https://doi.org/10.2307/j.ctt1qnw8nf

Gerding, J. A., E. Landeen, K. R. Kelly, S. Whitehead, D. T. Dyjack, J. Sarisky, and B. W. Brooks. 2019. "Uncovering Environmental Health: An Initial Assessment of the Profession's Health Department Workforce and Practice." *Journal of Environmental Health* 81(10): 24–33. https://pubmed.ncbi.nlm.nih.gov/31911703/

Gerding, J. A., B. W. Brooks, E. Landeen, S. Whitehead, K.R. Kelly, A. Allen, D. Banaszynski et al. 2020. "Identifying Needs for Advancing the Profession and Workforce in Environmental Health." *American Journal of Public Health* 110(3): 288–294. https://doi.org/10.2105/AJPH.2019.305441

Govender, C.M. and M. Wait. 2017. Work Integrated Learning Benefits for Student Career Prospects – Mixed Mode Analysis. *SA Journal of Higher Education* 31(15): 31–64 https://doi.org/10.20853/31-5-609

Ghanbari, R., R. Kalhor, M. Mousazadeh, S. Naderi, S. Moosavi and E. Mohammadi.2020. "The Correlations between Emotional Intelligence, Conflict Management Strategies, and Communication Skills of the Environmental Health Personnel in the Health Centers affiliated to Qazvin University of Medical Sciences in Qazvin. *Iran. J Human Environment and Health Promotion* 6(2): 77–82. https://doi.org/10.29252/jhehp.6.2.5

Gribble, N., R. K. Ladyshewsky, and R. Parsons. 2017. "Differences in the emotional intelligence between undergraduate therapy and business students and the population norms." *Asia-Pacific Journal of Cooperative Education* 18(3): 225–242. https://www.researchgate.net/publication/320138193_Differences_in_the_emotional_intelligence_between_undergraduate_therapy_and_business_students_and_the_population_norms

Gribble, N., R. K. Ladyshewsky, and R. Parsons. 2019. "The impact of clinical placements on the emotional intelligence of occupational therapy, physiotherapy, speech pathology, and business students: a longitudinal study." *BMC Medical Education* 19(90): 1–10 https://doi.org/10.1186/s12909-019-1520-3

Health Professions Council of South Africa (HPCSA): Professional Board for Environmental Health Practitioners- Education Committee. 2018. "Standard Operating Procedure for the Management of Work Integrated Learning to be conducted by Student Environmental Health Practitioners Registered with the Health Professions Council of South Africa." *PBEH Education Committee*, 1–24. Pretoria: HPCSA

Herrington, A. and J. Herrington. 2008. "What is an Authentic Learning Environment?" In *Authentic Learning Environments in Higher Education*, edited by T. Herrington and J. Herrington, 68–77. Hershey, PA: IGI Global https://doi.org/10.4018/978-1-59140-594-8.ch001

Heris, S.P. and M. B. Heris. 2011. “Relationship Between Emotional Intelligence and Conflict Management Strategies in Physical Education Experts of Tehran University.” *World Applied Sciences Journal* 15(11): 1619–1622. https://www.researchgate.net/publication/267988707_Relationship_Between_Emotional_Intelligence_and_Conflict_Management_Strategies_in_Physical_Education_Experts_of_Tehran_University

Holmes, A.G.D. 2020. “Researcher Positionality – A Consideration of Its Influence and Place in Qualitative Research – A New Researcher Guide.” *Shanlax International Journal of Education* 8(4): 1-10. https://doi.org/10.34293/education.v8i4.3232

Hudson, L., P. Engel-Hills and C. Winberg. 2022. “Radiation Physics in Theory and Practice- Using Specialization to Understand ‘Threshold Concepts’.” In *Enhancing Science Education*, edited by Margaret, A.L. Blackie, Hanelie Adendorff and Marnel Mouton, 103–126. New York: Routledge

IAA, 2015. “Personal beliefs, values, attitudes and behaviour.” Last modified 2015. http://www.iaa.govt.nz/adviser/ethics-toolkit/personal.asp. [Accessed 6 February 2024]

Jackson, D. 2015. “Employability Skill Development in Work-Integrated Learning: Barriers and Best Practice.” *Studies in Higher Education* 40(2): 350–367. https://doi.org/10.1080/03075079.2013.842221

Jackson, J., M. Jones, W. Steele and E. Coiacetto. 2017. “How best to assess students taking work placements? An empirical investigation from Australian urban and regional planning.” Higher Education Pedagogies 2(1): 131–150 https://doi.org/10.1080/23752696.2017.1394167

Jorre de St Jorre, T. and B. Oliver 2018. “Want Students to Engage? Contextualise Graduate Learning Outcomes and Assess for Employability.” *Higher Education Research & Development* 37(1): 44–57. https://doi.org/10.1080/07294360.2017.1339183

Kuhn, E.J., G. S. Walker, J. Wright, H. Whiley and K. E. Ross. 2021. “Public Health Challenges Facing Environmental Health Officers during COVID-19: Methamphetamine contamination of properties.” *Australian and New Zealand Journal of Public Health* 45(1): 9–12. https://doi.org/10.1111/1753-6405.13067

Kumar, G. and V. Sharma. 2019. “Emotional Intelligence through Soft Skills for Employability.” In *Proceedings of the International Conference on Advancements in Computing & Management,* 13–14 April 2019: 863–871. https://doi.org/10.2139/ssrn.3464916

Lima, D., J. Spahi, and V. Shala. 2022. “The Management of Emotional Intelligence in the Workplace Impact on Improving Employee Performance.” *Quality – Access to Success* 23(188): 297–301. https://doi.org/10.47750/Qas/23.188.40

Lincoln, Y. S. and E. G. Guba. 1985. “Naturalistic Inquiry.” *In Morse, T. M., Barret, M., Mayan, M., Olson, K. and Spiers, J. 2002.* Verification strategies for establishing reliability and validity in qualitative research. *International Journal of Qualitative Methods* 1(2): 13–22. https://doi.org/10.1177/160940690200100202

Maton, K. 2014. *Knowledge and Knowers: Towards a Realist Sociology of Education*. London: Routledge.

Maton, K. and R. T-H. Chen. 2017. "Specialization from Legitimation Code Theory: How the basis of achievement shapes student success." In Martin, J. R., Maton, K., Wang Pin and Wang Zhenhua (eds)*Understanding Academic Discourse*, Beijing: Higher Education Press

Maton, Karl and Yaegan Doran. 2017. Semantic Density: A Translation Device for Revealing Complexity of Knowledge Practices in Discourse, Part 1 – Wording. *Onomázein. SFL*. 46–76. https://www.researchgate.net/publication/277308487_Semantic_density_A_translation_device_for_revealing_complexity_of_knowledge_practices_in_discourse_part_1_-_wording/citation/download

Matsuzuka, Y. 2020. “Validity of Outcome-oriented, Competency-based Education in the Age of Global Student Mobility: Implications from an EU-Japan Comparative Study on Competencies Expected

of University Graduates." *Higher Education Forum* 17 (March): 1–20. https://doi.org/10.15027/48951

Merga, M. .2016. "Gaps in Work Readiness of Graduate Health Professionals and Impact on Early Practice: Possibilities for Future Interprofessional Learning." *Focus on Health Professional Education: A Multi-Professional Journal* 17(3): 14–29. https://doi.org/10.11157/fohpe.v17i3.174

Molomo, P.A. 2021. "Students' Reflection on Work-Based Experience: Connecting Social Learning to Theory and Practice at A South African University of Technology." In *Proceedings of ADVED 2021- 7th International Conference on Advances in Education, Online Conference, 18-19 October 2021*, 314–324. Turkey: ocerint Publishing https://doi.org/10.47696/adved.202157

Morse, T. M., M. Barret, M. Mayan, K. Olson and J. Spiers. 2002. "Verification Strategies for Establishing Reliability and Validity in Qualitative Research." *International Journal of Qualitative Methods* 1(2): 13–22. https://doi.org/10.1177/160940690200100202

Morse, T., K. Chidziwisano, D. Musoke, T. K. Beattie and S. Mudaly. 2020. "Environmental Health Practitioners: A Key Cadre in the Control of COVID-19 in Sub-Saharan Africa." *BMJ Global Health* 5, (7): 1–3. https://doi.org/10.1136/bmjgh-2020-003314

Nguyen, D. 2020. Task-Based Standard Operating Procedure Approach to Implement Business Process Management in Retail. In *5th International Conference on Finance and Economics, 13 November 2018, Vietnam* 1–18. Vietnam: ICFE. https://www.researchgate.net/publication/345813182_TASK-BASED_STANDARD_OPERATING_PROCEDURE_APPROACH_TO_IMPLEMENT_BUSINESS_PROCESS_MANAGEMENT_IN_RETAIL

Omid, A., F. Sepyani, N. Yamani, H. Pourzamani and P. Aghdak. 2021. "What competencies do environmental health graduates need to manage social determinants of health?" *Environ Health and Preventative Medicine* 26(114): 1–6. https://doi.org/10.1186/s12199-021-01036-x

Palinkas, L. A., S. M. Horwitz, C. A. Green, J. P. Wisdom, N. Duan and K. Hoagwood. 2015. "Purposeful Sampling for Qualitative Data Collection and Analysis in Mixed Method Implementation Research." *Administration and Policy in Mental Health and Mental Health Services Research* 42(5): 533–544. https://doi.org/10.1007/s10488-013-0528-y

Papoutsi, C., A. Drigas and C. Skianis. 2019. "Emotional Intelligence as an Important Asset for HR in Organisations: Attitudes and Working Variables." *International Journal of Advanced Corporate Learning (iJAC)* 12(2): 21–34. https://doi.org/10.3991/ijac.v12i2.9620

Patthanaissaranukool, W., P. Fongsatitkul and C. Warodomrungsimun. 2020. "Environmental Health Professionals in Developed Countries." *Environment Asia* 13(1)): 112–123. http://doi.org/10.14456/ea.2020.11.

Pott, R. W. M. and K. Wollf. 2019. "Using legitimation code theory to conceptualise learning opportunities in fluid mechanics." *Fluids* 4(203): 1–13. http://dx.doi.org/10.3390/fluids4040203

Queirós, A., D. Faria and F. Almeida. 2017. "Strengths and limitations of qualitative and quantitative research methods." *European Journal of Education Studies*, 3(9): 369–387. https://oapub.org/edu/index.php/ejes/article/view/1017

Republic of South Africa (RSA). 1996. Constitution of the Republic of South Africa, 1996. Pretoria: Government Printer

Saldanha, J. 2016. *The coding manual for qualitative researchers, 2nd ed*. Los Angeles: SAGE

Scholtz, D. 2020. "Assessing Workplace-Based Learning." *International Journal of Work Integrated Learning* 21, (1): 25–35. https://www.ijwil.org/files/IJWIL_21_1_25_35.pdf

Schmidmaier, R., S. Eiber, R. Ebersbach, M. Schiller, I. Hege, M. Holzer, and M. R. Fischer. 2013. "Learning the Facts in Medical School is Not Enough: Which Factors Predict Successful Application of Procedural Knowledge in a Laboratory Setting?" *BMC Medical Education* 13(28). https://doi.org/10.1186/1472-6920-13-28

Serrat, O. 2017. “Understanding and Developing Emotional Intelligence.” In *Knowledge Solutions: Asian Development Bank,* edited by Oliver Serrat, 49(June): 329–339. Singapore: Springer. https://doi.org/10.1007/978-981-10-0983-9_37

Shezi, B., A. Mathee, W. Siziba, R. A. Street, N. Naiker, Z. Kunene, and C. Y. Wright. 2019. “Environmental Health Practitioners Potentially Play a Key Role in Helping Communities Adapt to Climate Change.” *BMC Public Health* 19(54): 1–8. https://doi.org/10.1186/s12889-018-6378-5

South African Qualifications Authority (SAQA). 2017. “Registered Qualification: Bachelor of Environmental Health”, 1–5. Pretoria: SAQA http://pcqs.saqa.org.za/viewQualification.php?id=97777

Smith, C. 2012. “Evaluating the quality of work-integrated learning curricula: a comprehensive framework.” *Higher Education Research & Development* 31(2): 247–262. https://doi.org/10.1080/07294360.2011.558072

Smith, J.C., H. Whiley and K. E. Ross. 2021. “The New Environmental Health in Australia: Failure to Launch?” *International Journal of Environmental Research and Public Health* 18(1402): 1–10. https://doi.org/10.3390/ijerph18041402

Srivastava, K. 2013. "Emotional Intelligence and Organisational Effectiveness." *Industrial Psychiatry Journal* 22(2): 97–99. https://doi.org/10.4103/0972-6748.132912

Stewart, A. G., W. Shepherd, R. Jarvis, and S. Ghebrehewet. 2023." Environmental Public Health Practice: designing and delivering a locally desirable service." *Public Health* 221(July): 150–159. https://doi.org/10.1016/j.puhe.2023.06.009

Trede, F. 2012. “Role of work-integrated learning in developing professionalism and professional identity.” *Asia-Pacific Journal of Cooperative Education* 13(3): 159–167 https://www.ijwil.org/files/APJCE_13_3_159_167.pdf

Tushar, H., and N. Sooraksa. 2023. “Global Employability Skills in the 21st Century Workplace: A Semi-Systematic Literature Review. “*Heliyon* 9(11): 1–14. https://doi.org/10.1016/j.heliyon.2023.e21023

Umanailo, M. C. B., I. S. Hamid, H. Hamiro, S. S. F. Assagaf, M. Bula, M. Nawawi, S. Pulhehe, et al. 2019. "Utilisation of Qualitative Methods in Research Universities." In *Proceedings of the International Conference on Industrial Engineering and Operations Management Pilsen, July 23–26, 2019, Czech Republic*, 2076–2081. Czech Republic: IEOM International http://ieomsociety.org/pilsen2019/papers/570.pdf

Von Treuer, K., V. Sturre, S. Keele, and J. McLeod. 2011. “An integrated model for the evaluation of work placements.” *Asia Pacific Journal of Cooperative Education* 12(3): 195–204. https://media.proquest.com/media/hms/PFT/1/U9sQ9?_s=a02kr5zFMrTY4zAqKLcczYgCLE8%3D

Walker, B. Jr., S. Miles-Richardson, and R. Warren. 2014. “The Environmental Health Workforce in the 21st Century.” *Journal of Environmental Health* 77(5): 28–31 https://www.jstor.org/stable/10.2307/26330159

Whiley, H., E. Willis, J. Smith, and K. Ross. (2019). “Environmental Health in Australia: Overlooked and Underrated.” *Journal of Public Health (Oxford, England)* 41(3): 470–475. https://doi.org/10.1093/pubmed/fdy156