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ORIGINAL ARTICLE

A benchmarking and comparative analysis of emotional intelligence in student and qualified radiographers: an international study

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Abstract

Introduction: Emotional intelligence (EI) has been identified as an important trait for healthcare students and healthcare professionals alike and is a predictor of improved work performance and patient satisfaction. In this paper, we benchmark an international cohort of radiography students and compare their scores to those of known qualified practitioner and normative data. **Methods:** EI scores were at commencement from radiography degree programmes at four universities in Australia, Hong Kong, Republic of Ireland and the United Kingdom using the short form of the trait EI questionnaire (TEIQue-SF), which yields a Global score and four sub-factors. In total 293 students chose to participate. **Results:** For the Australian combined Irish and UK groups, there were significant differences in Global EI and three of the four sub-factors between students and qualified radiographers (Australia: students = 5.01, qualified = 5.27; $P \leq 0.01$) (Irish/UK students = 5.04, qualified = 5.28; $P \leq 0.01$). When compared to the UK normative data, there was a significant difference for Global EI between the UK students and the UK norm data set (students = 4.71, normative = 4.99; $P \leq 0.01$). **Conclusion:** This study provides benchmarking data for an international radiography student group. The clear differences of higher EI scores for qualified practicing radiographers when compared to student score opens discussion of the impact of academic and clinical practicum as a contributing factor in EI skills development.

Introduction

Emotional Intelligence (EI) refers to the 'ability to monitor one's own and others' emotions, to discriminate among them, and to use the information to guide one's thinking and actions'.[1] In a healthcare field such as radiography, where communication and sociability are at the forefront of inter-personal relationships between practitioners and patients, emergent data shows a positive relationship between one's ability to control one's emotions and the effect on one's social interactions.[2] Accordingly, EI traits are likely to impact on personal interactions in the health workplace, such as the relationship between patients and radiographers and amongst radiography staff.

This study reports on the initial findings of an international study investigating EI using the Trait EI tool. The baseline EI scores for radiography students at the beginning of their higher education programmes in four countries. Students' scores are then compared with EI scores from both published studies involving registered, practicing radiographers and a normative comparison group.[3,4] For the purpose of this article, the term

'radiography' incorporates both practitioners and students whom are diagnostic radiographers (DR), and radiation therapists (RT) or known as therapy radiographers.

EI and the trait EI tool

EI has been recognised as a valid measure of the way in which emotions are used and accessed and is measured by people's self-perceptions of their emotional abilities.[5] EI has roots in social intelligence and is often described as an emotional quotient that one possesses in order to be able to make decisions and control factors that influence our emotions. It is generally accepted that there are two main models of EI: the Mixed method (which includes Trait EI) and the Ability method. The trait-mixed method can be described as more dispositional in nature and claims to have a stronger link to personality.[6]

In this study, we use the TEIQue-SF, which is a 30-item self-report questionnaire that yields the Global trait EI score along with a breakdown into the four factors: well-being, self-control, emotionality and sociability. These are schematically represented in Figure 1. Trait EI has been validated for use in early-adulthood to old age and, similar to a measure of Intelligence Quotient (IQ), has been reported to be temporally stable over age and gender.[6,7] Therefore, a significant variation should not be seen for female-male identification or for age. However, and again like IQ,

some studies have shown that EI scores can be improved through concerted education and/or reflective activities.[7]

Exploring EI in providing health care

The importance of EI scores as a predictor of improved work performance and career selection is becoming increasingly accepted within medicine and allied health fields.[8] In many ways, health care is slowly catching up with commercial and business studies, which have long established the importance of EI for leadership, creativity and role suitability.[8,9] The critical reviews by Zeidner et al.[10] together with studies by Birks and Watts[11] and Lopes et al.[12] report EI to be an important construct in domains of work, where emotional encounters are pivotal. In work contexts where strategies for complex decision-making are necessary, trait EI has been found to be influential in assisting with controlling decision-related emotions,[7] with a study in psychiatry showing clear links between higher EI traits of emotional self-awareness and empathy.[13] Research involving EI and medicine,[14,15] nursing,[16] physiotherapy,[17] and radiography[3,4,18] have postulated improved application to work tasks and patient compassion with a clear need for further research to continue these discussions. Interestingly, the importance of EI in radiology has been recognised as a core skill related to patient care[19] and a recent study of EI of radiologists has shown that higher Trait EI scores in aspects of self-control and sociability are associated with higher performance in cancer detection in mammography.[20]
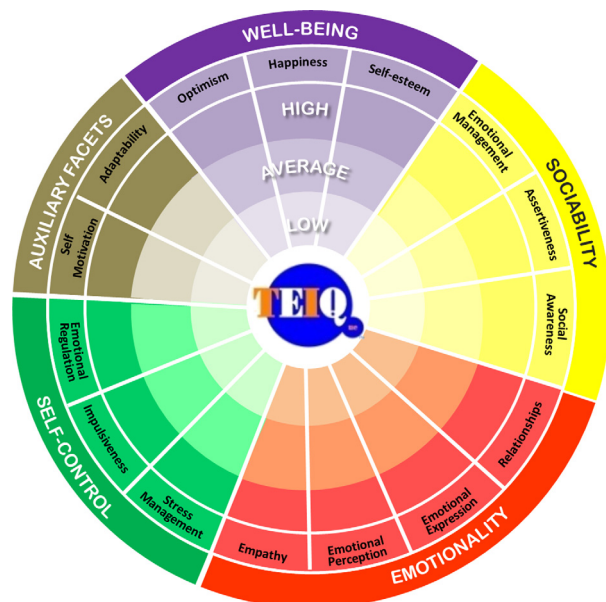
EI in student and qualified radiography practitioners

In recent years, there has been a momentum of research and commentary into the value of EI in radiography[3,4] and radiology.[19,20] A previous study in the field of EI and radiography practice suggested that there are benefits in the application of EI due to the nature of the work, which is often highly emotive, personal and takes place in the complex context of health, trauma and cancer service provisions.[4]

In 2013 Mackay et al. benchmarked the Trait EI of radiographers in the United Kingdom and Australia and recommended more in-depth investigation into this area.[3] The authors used the Trait EI measure and explored Global EI and the four factors of well-being, self-control, emotionality and sociability. This study responds to the recommendations of the MacKay et al.[3] paper by examining EI in the radiography student population. Here, in this prospective study, both therapy and diagnostic student cohorts are examined under the single grouping of 'radiography' or 'student radiographers' with

Figure 1. Trait emotional intelligence global sampling and the four factors of well-being, sociability, emotionality and self-control.[5] Copyright© K. V. Petrides – London Psychometric Laboratory, 2001. All rights reserved.

previous studies[3,4] indicating there is no difference in the EI of these two medical radiation practitioner groups. Furthermore, with two of the four universities involved in this study operating in the United Kingdom and Ireland, where radiography is used to describe both therapy and diagnostic forms, it is appropriate to use this overarching term in this paper. Radiography education is taught at the degree level (undergraduate and postgraduate) across the four countries involved in this international study and this is a common pattern worldwide.

Objectives

The objectives of this study are to:
(1) Benchmark the EI scores of radiography students across four degree programmes.
(2) Analyse the Trait EI scores between radiography students and published qualified radiography practitioner norms.
(3) Analyse the Trait EI scores between student radiographers and normative data for the general population.

Methods

All data were collected in the first month of the 2012/2013 academic year (Hong Kong, Republic of Ireland and the United Kingdom) and for the 2013 academic year (Australia) at the beginning of the first semester across all radiography programmes, at the University College Dublin, the University of Liverpool, Hong Kong Polytechnic University and the University of Sydney/All students ($N = 484$) were eligible for inclusion in the study. The short form of the trait EI questionnaire (TEIQue-SF) was included as an online questionnaire along with questions to capture demographic data including age, gender and programme type.[18] Collected students' data were compared with existing normative data for the general population[20] along with the existing EI TEIQue_SF data for UK and Australian qualified radiographers.[3,4,21]

Following ethical approval from each participating university, short presentations were given locally to all incoming first-year students in order to provide them with information regarding EI and the purpose of the research. Students subsequently received invitations to participate in the study via student email accounts. These emails contained further information about the research study along with the link to the online questionnaire. By voluntarily accessing the online questionnaire, students indicated that they consented to participate in the research and confirmed their consent for their data to be included through one of the initial questions.

The statistical analysis used multivariate analysis of variance (MANOVA) with post hoc Tukey tests. Two comparisons were undertaken in this study. Firstly, the students' EI cores were compared to both the UK qualified radiographers' data ($n = 2065$) and the Australian qualified radiographers' data ($n = 954$). The Ireland sample was considered to be similar to the UK sample so the same comparison data were used. However, following differences identified in the analysis of this data by country as shown in the student sample, the use of UK comparative data for qualified radiographers was not considered suitable for Hong Kong students, so they were excluded from this student-practitioner comparison.

Secondly, the students' EI scores were compared to a norm population. The comparison normative data ($n = 866$) were drawn from the TEIQue-SF normative database which consisted of individuals in a range of jobs, for example, private sector, public sector and armed forces.[20] This data set was considered applicable for comparison with the collected UK, Irish and Australian data following communication with the owner of the TEIQue normative database.[22]

Results

Benchmarking of the student cohort

In total, 293 students across the four institutions participated in the study with respective response rates of 80.0% ($n = 73$; UK), 82.5% ($n = 33$; Ireland), 64.0% ($n = 123$; Hong Kong) and 39.7% ($n = 64$; Australia). The number of responses showed that data were representative of cohorts from each university. Table 1 shows the mean Global and four factor scores and effective sample size for all countries.

The Australian comparisons revealed significant differences in Global EI and three of the four factors (see

Table 1. Emotional intelligence global and factor scores for student cohort.

	Sample size	Global EI	Well-being	Self-control	Emotionality	Sociability
Australia	59	5.01	5.39	4.72	5.11	4.73
Ireland	34	5.01	5.53	4.43	5.09	4.82
H.K.	119	4.75	4.94	4.57	4.98	4.49
U.K.	73	5.05	5.42	4.59	5.11	4.98

Fig. 1), with qualified radiographers (n = 956) mean scores being higher than the students (n = 59). Global EI score Students (S) = 5.01, Qualified (Q) = 5.27; Well-being S = 5.39, Q = 5.82; Self-Control S = 4.72, Q = 5.03; Emotionality S = 5.11, Q = 5.25.

The combined UK and Irish student group comparisons revealed highly significant differences in Global EI and three of the four factors (see Fig. 2) when compared with the UK qualified radiographers (n = 2065), as the qualified mean scores were higher than for the students (n = 104).

Global EI score Students (S) = 5.04, Qualified (Q) = 5.28; Well-being S = 5.41, Q = 5.75; Self-Control S = 4.52, Q = 4.89; Emotionality S = 5.10, Q = 5.38.

Comparison with general population norms

The UK and Irish student data sets were compared separately with the UK norm data. No statistically significant differences were found with the Irish student data set. However, there was a difference in UK students
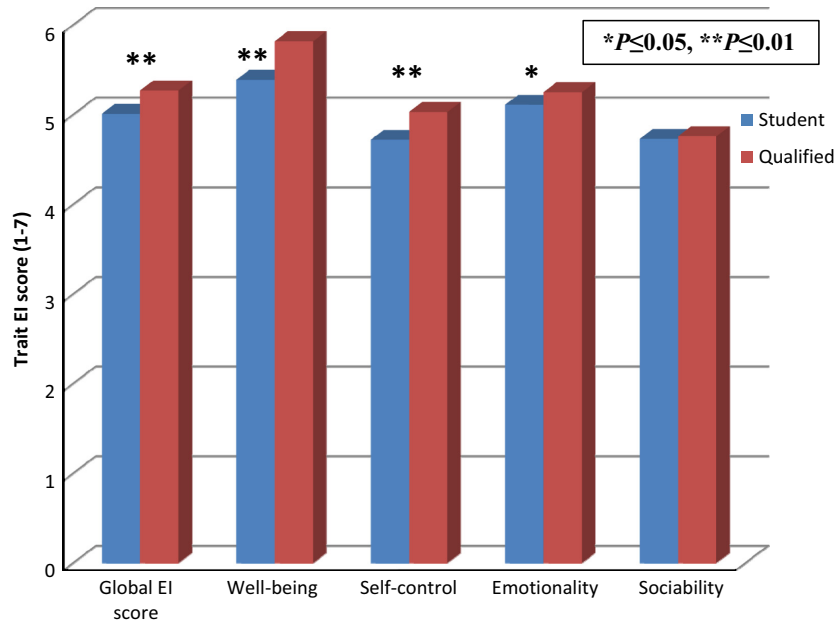

Figure 2. Comparison of emotional intelligence scores between the Australian student radiographers and qualified Australian radiographers.
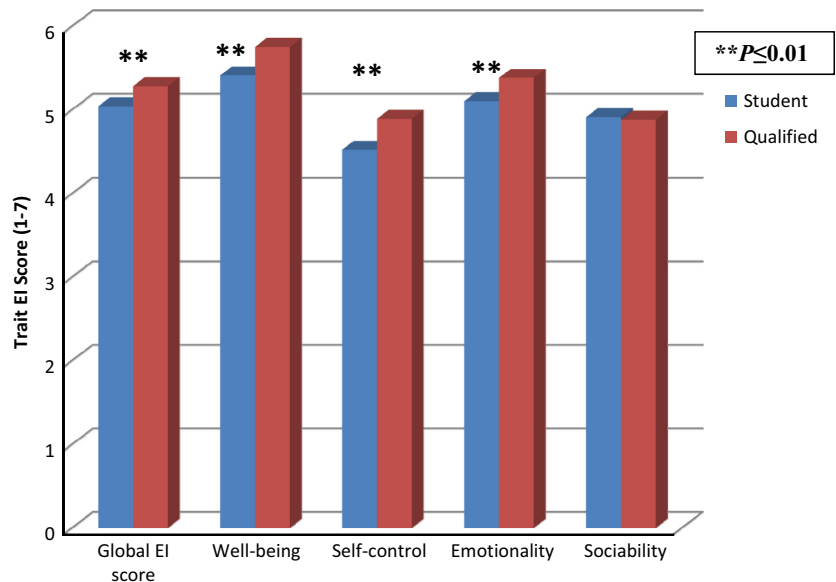

Figure 3. Comparison of emotional intelligence scores between the UK/Irish student radiographers and the UK qualified radiographers.

Global EI with the UK norm data set. This was highly significant ($F_{(1, \ 915)} = 9.13$, $P \leq 0.01$) with means of Student = 4.71, Norm = 4.99. No differences were found in any factors.

Comparison with the Australian sample revealed a different profile with Global EI and all factors being significantly different to the UK norms (see Table 2).

Discussion

Overall, the student group scored consistently lower than the UK and Australian qualified radiographer groups for both the Global EI score and three of the four factors. This demonstrates that a distinction exists between the radiographers at the start of their higher education and those who are qualified and practising. The students self-reported as lower in their EI skills than the qualified practitioner data referenced in this article. The authors of this study postulate that the radiography academic-theoretical curriculum, in addition to the embedded clinical practicum could be factors in the development of EI during higher education and early practitioner experiences, resulting in an elevation of EI for qualified radiography practitioners. Certainly other student studies in EI have made this link and a study of student psychologists by Nelis et al.[22] suggested that EI could be developed through effective educational interventions at an undergraduate level. It would also be reasonable to assume that during the delivery of higher education programmes, EI might alter depending on the effectiveness, relevance and quantity of EI educational activities within programmes, however, little is known about this relationship.

A limitation to drawing the above conclusion is that our practitioner sample was highly qualified and pedagogy and educational theory has developed significantly in the last 30 years although with a mean age of 41.2 years for the published practitioner study, many of these radiography graduates would have completed early incarnations of

degree programmes. Furthermore, caution needs to be exercised in reporting student/practitioner differences as these may be a chance finding as this was a cross-sectional study with no control group. A longitudinal study, as intended by this research group, would enable charting of the changes that occur and potentially provide evidence of the effect of the prescribed radiography curriculum on EI development. In investigating curricula, this study involves participants from four individual universities in four different countries and as such generalisations about radiography curricula cannot be made.

Another factor which might have an impact on practitioners' scores is clinical practice. Repeated exposure to patients and real-life scenarios enables the practising of patient care skills which may be a factor that helps EI development in practitioners. Considering many students in our study transition into higher education directly from school and who qualify to practice at approximately 21–22 years, there is a considerable difference in age and clinical practice years and is likely to have contributed to the final scores of the qualified radiographer group. A study showing scores on graduation and after several years of practice would help to clarify the impact of this experience on EI development. It should be noted that in the Trait EI model used in this study, individual's scores are not expected to change dramatically throughout the lifespan[5] and thus the significant difference above would not be attributed to a simple increase in age. Rather, Petrides[5] describes 'significant life events' or a 'conscious effort on the part of the individual' before Trait EI scores change, with Mortiboys[23], suggesting that effective EI education can bring about these changes.

The lack of difference between the UK general population norms and the Irish students, along with the difference in only the global EI score for the UK students, suggests that these radiographer populations are more closely aligned to the EI of the general population than might have been first thought. It had been anticipated that

Table 2. Australian students emotional intelligence compared with the UK general population norms (Petrides[5]) adjusted for age and gender.

Students N = 64 Norm N = 838	Mean score	Difference	*F*-statistic (DoF)	Significance
Global EI score	Student = 4.62 Norm = 4.99	−0.37	14.32 (1, 898)	<0.001*
Well-being	Student = 4.97 Norm = 5.41	−0.44	13.14 (1,898)	<0.001**
Self-Control	Student = 4.35 Norm = 4.57	−0.22	4.27 (1, 898)	0.04*
Emotionality	Student = 4.71 Norm = 5.05	−0.34	5.14 (1, 898)	0.02**
Sociability	Student = 4.36 Norm = 4.82	−0.46	20.55 (1, 898)	<0.001**

*$P \leq 0.05$, **$P \leq 0.01$.

students with high EI might self-select for a career in the health profession, however, this study has demonstrated that the students begin their higher education with a similar baseline of EI as in the general population.

Some authors have argued that EI should be used as a selection criterion for entry into the healthcare programme, such as for nursing [24,25] and medical students.[26] The results of this study, using the trait EI measure, would suggest little value in doing so for the radiographer population as there is little distinction between radiography students EI scores and those of the general population. Moreover, if the differences between the student radiographer scores and those of the qualified radiographers is due to the radiography curricula, this would suggest that selection using EI would not help to make more emotionally intelligent radiographers upon graduation.

The significant differences that have emerged between the UK norms and the Australian radiography students is an unexpected finding and runs counter to the findings of the UK and Irish students. The findings suggest that the Australian students perceive themselves as having a lower EI than the UK general population. This might be a chance finding for this sample group and further studies would need to be undertaken to confirm its veracity. One reason for this finding might lie in the comparative data. The lack of norm data for the Australian population led to the use of the UK comparative data group which might not be the most appropriate data set. The Australian student sample was noted to be multicultural with a significant Asian influence and this is a feature of the general DR student demographic from the University of Sydney due to the geographical location of the campus in western Sydney, which is considered a highly multicultural region.[27]

In the comparison between EI in qualified radiographers in the United Kingdom and Australia, using the same trait EI measure, the only difference found lay in the well-being factor, indicating similarity between the two countries.[3] Petrides (2012, Pers. Commun.) indicated that the UK EI norm data could be used in an Australian context. However, as noted before, the mean age of the Australian qualified cohort was in the early 40s and Australian migration has significantly changed to an Asian pattern in the last 20 years with a shift away from English/Irish immigration.[27] Further work needs to be done to explore the applicability of UK norms to the Australian population. The impact of culture upon the EI scores is another consideration with some studies indicating that the Asian population rate is lower in scores where the 'self' is measured[28] and this may also be seen in the HK student scores from Table 1.

Conclusion

This study demonstrated higher EI scores for qualified radiographers when compared to the student cohorts, supporting the theory that the curriculum and embedded clinical practicum is likely to be a contributing factor in EI skills development. Little distinction was found between radiography students EI scores and those of the general population. The lower EI scores for the Australian students when compared to the Irish and UK students was an unexpected finding which may have been influenced by the ethnic backgrounds of the Australian cohort but this requires further investigation. This preliminary study will be extended to map the educational curricula (academic and work integrated learning components) as radiography students' progress into their second year of higher education and transition from basic science curricula to professional practice education.

Conflict of Interest

The authors declare no conflict of interest.

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