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Emotional Intelligence and Success in Initial Vocational Education and Training: A Study Among Healthcare Assistants and Social Care Workers

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Abstract

Context: Research on emotional intelligence (EI) shows this concept's decades-long positive influence on well-being, self-efficacy, employability, and academic and professional achievement. Indeed, several studies have demonstrated that students with high EI have better grades and quality of life, as well as are more employable than students with low EI. By considering the two conceptualizations of EI as either an ability or personality trait, the present study investigates EI's influence on training achievement in initial vocational education and training (IVET). We posited that the two types of EI positively influence training achievement in a complementary way: Ability EI relates to achievement in theoretical training, while trait EI relates to achievement in practical training. Furthermore, these links are mediated by apprentices' engagement at school and in learning.

Method: To test our hypotheses, 92 dual IVET health and social care apprentices in their last year of vocational school completed an online survey composed of validated scales measuring EI as an ability, EI as a personality trait, personality traits, and school engagement. The apprentices' grades were also obtained with their permission.

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Results: The findings confirmed our hypotheses and reflected EI's positive influence on training achievement. We observed that participants with high EI (as an ability and personality trait) obtained better grades than participants with lower EI. Moreover, our results showed that ability EI has a direct influence on achievement in theoretical health and social care training, while the link between trait EI and practical training is indirect and mediated by engagement in learning.

Conclusion: The present study confirms EI's positive influence on school achievement in the VET context and further corroborates the important role that EI can play in dual IVET apprentices' achievement, particularly in the health and social sectors. This original study contributes to research on the VET system by placing EI among the skills necessary to ensure professional success.

Keywords: Apprenticeship, Emotional Intelligence, Health and Social Care Sectors, Initial Vocational Education and Training, Training Achievement, VET

1 Introduction

Socio-emotional competences are considered part of those of the 21st century, essential to professional achievement and, more generally, to life (Bughin et al., 2018). Among them, emotional intelligence (EI) plays a fundamental role, itself defined as the capacity of individuals to identify their own and others' emotional reactions; express them; control them; and deeply understand and use this understanding as support to action. Although research on EI differs depending on its measurement as either an ability or personality trait, EI as a necessary quality for sustainable education is emerging as a new topic that has important implications for vocational education and training (VET) teachers, in-company trainers, and apprentices.

1.1 Emotional Intelligence

The EI construct as introduced by Mayer and Salovey (1997) describes four EI components: *Emotion perception* (the recognition of emotions in oneself and others), *emotion facilitation* (the use of emotions to enhance thinking and behavior), *emotion understanding* (the understanding of how emotions originate, develop, and change during emotional experience), and *emotion management* (the management of one's and others' emotions). EI can then be conceptualized and measured using two different approaches (Mayer et al., 2008; Neubauer & Freudenthaler, 2005), each of them predicting different important outcomes. The ability approach considers EI to be an ability or form of objective intelligence. Olderbak et al. (2018)

reported that ability EI is strongly associated with two components of classic intelligence: Fluid and crystallized intelligence, which are involved in reasoning and solving new problems. Ability EI can be measured using tests based on objective performances (Mayer & Salovey, 1997). The second approach conceives EI as a dispositional tendency, like a personality trait, and measures it with self-reports (Petrides & Furnham, 2020). Trait EI, or trait emotional self-efficacy, is described as a constellation of emotional self-perceptions. Trait EI provides an operationalization of the affective aspects of personality (Petrides et al., 2011).

The two approaches differ in their conceptualizations and measurements and are not correlated (Vesely Maillefer et al., 2018), although they may predict the same outcomes. However, the common main point between ability and trait EI is that they both provide a construct distinct from classic IQ. A second important point is that EI can be trained and improved (Dacre Pool & Qualter, 2012; Hodzic et al., 2017). Hodzic et al.'s (2017) meta-analysis confirmed previous findings that training increases EI (Schutte et al., 2013). Moreover, the authors showed that training based on ability EI models has significantly stronger effects than training based on trait EI. Indeed, training programs focusing on ability EI are well known and have been used for decades in education (Corcoran et al., 2018). Another meta-analysis conducted by Durlak et al. (2011) showed the positive impact of the SEL (Social and Emotional Learning) program on school achievement in particular.

1.2 EI and School Achievement

For decades, psychological research has shown that emotions are valuable assets to happiness and success (Cherniss et al., 2006). By understanding, controlling, and using emotions, individuals improve their well-being and life achievements. EI especially is associated with better health, including mental and physical well-being (Martins et al., 2010; Solberg et al., 2023). As EI is important in life, it is a well-known predictor of academic achievement (Petrides et al., 2004). In a recent meta-analysis, MacCann et al. (2020) reported that EI is the third most important predictor of academic performance after classical intelligence and conscientiousness. Additionally, the authors defended that ability EI is a stronger predictor of performance in humanities than in science and that trait EI is a stronger predictor of grades than standardized test scores, though trait EI showed little incremental power over intelligence and personality. EI is also an important factor to foster teachers' well-being (Vesely-Maillefer & Saklofske, 2018) and self-efficacy beliefs (Gay et al., 2022). The results of interventions on emotional competences in students showed that those with higher EI have more advantages than students with lower EI. For instance, they exhibited better conflict management and related emotions; had a lower dropout rate; and were more efficient in social adaptation at school (Dowling et al., 2019; Nathanson et al., 2016). Moreover, EI is positively associated with general resilience and correlated with employability, self-efficacy, and decision-making

in young adults (Di Fabio & Kenny, 2015). However, school achievement is not only influenced by intelligence – emotional or classical – as school engagement also plays a role in academic success.

1.3 School Engagement, Achievement, and EI

School engagement is one of the different factors that influence school achievement (Carini et al., 2006). Engagement is usually conceptualized as the effort that students direct toward their learning (Pascarella & Terenzini, 2005). However, engagement involves more than just participation in educational activities: it involves feelings and sense making as well (Harper & Quaye, 2009). Engagement can therefore be understood at different nested levels (Philp & Duchesne, 2016; Skinner & Pitzer, 2012). First, at the school as a pro-social institution level, engagement promotes concept retention and graduation, as well as a form of citizenship behavior toward the scholastic institution. Second, at the classroom level, engagement is the source of student achievement. Lastly, at the learning level, engagement is linked to resilience and coping, as well as to facilitating the learning process (Skinner & Pitzer, 2012). As Skinner and Pitzer (2012) explained, "within a multilevel perspective on engagement, student constructive participation in academic work enjoys a privileged status as the focus of research on engagement because it is the only gateway to learning and scholastic development" (p. 37). This suggests that looking at engagement – in several of its facets – could also explain educational achievement. That said, it is necessary to point out that given the multiple approaches adopted to describe and study the notion of engagement, a true consensus does not yet exist in the literature (Reschly & Christenson, 2012).

Furthermore, Lei et al.'s (2018) meta-analysis and the study realized by Estévez et al. (2021) investigated the influence of school engagement in academic success at different levels, that is, from primary school to university. Other studies have demonstrated that school engagement grows linearly from the end of primary school (Stoel et al., 2003); others yet showed that the more personal investment, intensity, and perseverance in working on a school task, the better the achievements that can be expected (Peetsma, 1992). In general, academic engagement was found to be positively predicted by student engagement (Lei et al., 2018), the latter being commonly considered a mediating variable to explain success (Chen, 2005; Tao et al., 2022). More importantly, one study showed the role of trait EI on school engagement at the college level (Maguire et al., 2016), with students with higher trait EI showing stronger school engagement.

Nevertheless, the majority of studies investigating the role of school engagement have focused on the academic context, leaving this question unexplored in VET.

1.4 EI in the VET Context

Regarding the VET context, only a few programs in Europe have been implemented to increase EI. One literature review aimed to provide the state of the art on existing intervention programs to improve emotional competences (Sauli et al., 2022), showing that such interventions are very limited in the VET context as compared to the general educational literature. This literature review also illustrated how interventions to improve emotional competences could be adapted to the VET context (particularly the cohabitation of two training places, the heterogeneity of the considered professions, their priorities in terms of emotional management, etc.). In addition, a recent study investigated EI in VET and showed its relevance in improving employability (Līce & Sloka, 2019). However, the role of EI in VET continues to be underestimated and can benefit from further investigation, especially in training sectors where emotions play a central role, such as health and social care.

1.5 Health and Social Care Training in Switzerland

The training courses for healthcare assistants and social care workers certified by a federal VET diploma are relatively recent in the Swiss initial vocational education and training (IVET) landscape (SERI, 2016, 2020). Despite this, of the approximately 240 training courses offered in IVET, the two mentioned above rank second (healthcare assistants) and fourth (social care workers), respectively in the ten most popular IVET courses undertaken by young people in Switzerland (SERI, 2022). These results reflect the popularity of training in the social and health professions among Swiss apprentices and justify interest in this population.

In addition, among the professional competences formally required to perform the job optimally – as indicated in the profile description (training ordinance) – there is "communicating in a way that is appropriate to the recipient and the situation " or "contributing to conflict resolution" for social care workers (SERI, 2016) and "establishing professional relationships with clients and their environment" for healthcare assistants (SERI, 2020), which clearly require emotional competences. More generally, the healthcare assistant and social care worker professions call for a certain level of EI to manage one's own emotions and those of the patient, client, or beneficiary (Dugue et al., 2021; Faguy, 2012; Ingram, 2012; Louwen et al., 2023). In contrast, despite the relevance of EI in many training courses and business sectors, this topic has been very rarely addressed in the VET context, both in terms of vocational school curriculum and interventions meant to improve apprentices' emotional competences.

1.6 The Present Study

Our study aims to investigate the influence of EI on training achievement in the IVET context. According to previous studies showing the positive link between EI and success at school (Mayer et al., 2008), we posit that this link may also exist in VET. This domain is peculiar because apprentices have both practical and theoretical training in one specific area. In addition, apprentices learning to become professionals in the health and social work sectors should especially benefit from higher EI because of the nature of their work, which requires managing emotionally charged situations, being able to understand one's emotions, and having confidence in their ability to use emotions in the best possible way to assist clients and perform the required actions effectively. Hence, we hypothesized that the role of EI exceeds that of other well-known predictors of school success, namely general reasoning and personality factors.

Moreover, we hypothesized that the concepts of EI as an ability and personality trait are complementary in the sense that they predict partially distinct outcomes. Ability EI is conceptualized as a form of intelligence and hence it should predict more theoretical aspect of grades, such as general professional knowledge. Furthermore, research has already shown that students who can more effectively manage emotions better adapt to the school context and schoolwork, making them feel more connected with their institution (Barragan Martin et al., 2021). Hence, we argue that engagement with the school could play a role in explaining the link between ability EI and grades. At the same time, ability EI has emerged in several studies as having a direct effect and is not mediated by other processes, different from trait EI (see, e.g., Udayar et al., 2020). For this reason, we hypothesized that the link between ability EI and professional knowledge education grade is positively mediated by school engagement, though we also expected a direct effect (hypothesis 1a), as described in Figure 1. Because trait EI mainly refers to individuals' self-perceptions of their capacity to manage emotions and interpersonal relationships, we hypothesized that this type of EI has a stronger impact on the practical component of grades, such as how apprentices perform during on-the-job training; indeed, self-efficacy beliefs, such as those measured with the trait EI scale, may predict actual behavior (Bandura, 2004). In addition, as stated in the literature, we proposed that this link could be mediated by engagement (Chen, 2005; Tao et al., 2022). Based on studies regarding the different engagements (Skinner & Pitzer, 2012), we thus posited that trait EI is mediated by engagement in learning, as described in Figure 1 (hypothesis 1b). Individuals with high EI might find it easier to learn professional topics related to people's health and social context, which might increase their engagement with learning and thus lead to higher practical grades.

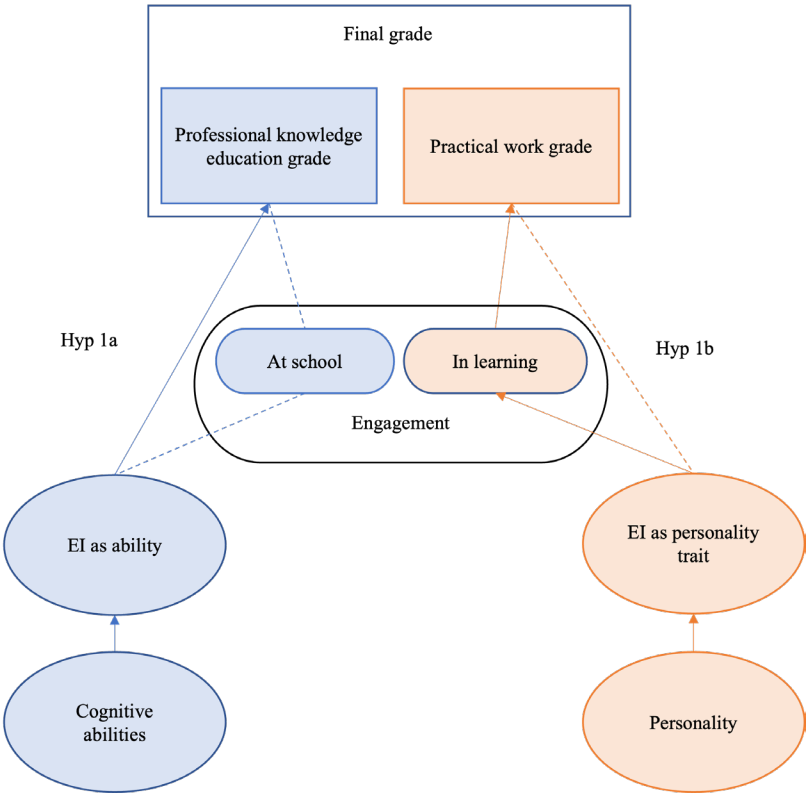

Figure 1: Theoretical Model of the Influence of EI as Ability and Personality Trait on School Achievement

Overall, we predicted that apprentices with higher EI are more successful (i.e., obtain higher grades) than those with lower EI. We also proposed that ability EI is more oriented toward the theoretical aspect of training, while trait EI is more oriented toward the practical part (hypothesis 2). In this sense, the two constructs of EI are complementary.

2 Method

In this section are described the participants who took part in the study, the procedure and the measures used.

2.1 Participants

In total, 110 of last year's dual IVET apprentices in the health and social care sectors took part to this study. Fifteen apprentices were excluded from the data analysis because they did

not complete the entire survey, two were excluded for not providing their names (necessary to match the grades with our variables of interest), and one did not accept the conditions to participate in the study, leaving a sample of 92 participants (77 females and 15 males; age: $M = 21.64$, $SD = 2.63$).

2.2 Procedure

An online survey (lasting an average of 25–30 minutes) was administered to apprentices on a voluntary basis during school time at a vocational school in French-speaking Switzerland. Once the participants were logged in, they first completed the informed consent form and, if they agreed to participate in the survey, then began different questionnaires as described in the following measures section. Finally, the participants answered a few demographics questions. At the end of the survey, the participants received a message informing them that they completed the surveys and thanking them for their participation. We were also allowed to receive the apprentices' final grades from the vocational school, which enabled us to match them with the personal code created by each participant. The participants' names were deleted from the files to guarantee anonymity.

The online survey was composed of several sections, as detailed below.

2.3 Measures

The *Situational Test of Emotional Understanding* (STEU, short version; MacCann & Roberts, 2008). Because no French validated version of the STEU is available, a PhD student who is a native French speaker and also fluent in English translated this measure's items from English into French; then, the translated version was revised and adjusted by a native English-speaking postdoctoral researcher who is also fluent in French. The participants started the survey with the 25 items of the STEU, which measures EI as an ability. Each item described a situation where participants chose which emotion (among five choices) best described how the character in the situation would feel. For example: "Clara receives a gift. Clara is most likely to feel: (a) Happy, (b) angry, (c) frightened, (d) bored, (e) hungry. If you think Clara would feel happy, you would mark option 'a' and then move to the next question." Responses were scored as correct or incorrect. Cronbach's alpha was .40 in our sample[1]. A global score was calculated based on the total number of correct answers (0–25).

The *Ten-Items Personality Inventory* (TIPI; Storme et al., 2016). The participants proceeded to complete the 10 items on the TIPI scale, which measures the five personality factors of extraversion, agreeableness, conscientiousness, emotional stability, and openness. The parti-

1 It has been suggested that because of the inherent heterogeneity of situational judgment tests such as the STEU, alpha coefficients are unsuitable indicators of such tests' reliability (Neubauer & Hofer, 2022; Whetzel & McDaniel, 2009) and test-retest or parallel forms should be employed instead.

cipants were requested to answer items such as "I consider myself an extrovert" on a 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*). Cronbach's alpha was .45 in our sample[2].

The *shortened Raven's Standard Progressive Matrices* (RSPM; Raven & Court, 1998). A selection of 36 items from the original RSPM (Set B, C, D) were proposed to the participants in increasing difficulty. In this task, each item presented a matrix of black and white patterns. The respondents were required to infer which missing pattern among 6 or 8 possible choices was the correct one that continued the series. Responses were scored as correct or incorrect. The participants were asked to do their best and had a five-minutes time limit to answer the maximum number of items. Cronbach's alpha was .91 in our sample. Total score was calculated by summing the correct items (0–36).

The *school engagement questionnaire* (Lam et al., 2014). We selected 21 items referring to engagement at school, engagement in learning, and engagement in the classroom from Lam et al.'s (2014) school engagement scale. The 21 items from the categories affective and behavior engagement were selected because they better related to the purpose of the study, which is centered on emotional skill. They were then grouped into three subscales based on the contextualization of each item, which referred to "learning," life at "school," and what was happening in "class"; these items were translated into French. The participants were asked to report if the statements applied to them during the last semester of their school year. Items such as "I am very interested in learning" were rated on a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). Cronbach's alpha was .83 in our sample. The Cronbach's alpha values of the three sub-scales were also calculated as .66 (engagement in learning), .73 (engagement at school), and .69 (engagement in the classroom).

The *Trait EI Questionnaire-Short Form* (TEIQue-SF) in its French version (Mikolajczak et al., 2007). The TEIQue-SF measures EI as a personality trait. The participants answered 30 statements, such as "Usually, I find it difficult to regulate my emotions," on a 7-point Likert scale (1= *strongly disagree* to 7= *strongly agree*) based on how well the statements described them. They were informed that there were no correct or incorrect answers. The total scores were calculated, and Cronbach's alpha was .85.

Grades. To have an objective measure of training achievement and confirm the agreement of each participant, we were allowed to access their grades. In addition to a global grade, we obtained scores on each grade subcomponent. Some of these grades were defined by the vocational school (e.g., general knowledge), others by a training company (e.g., practical training), or by federal final examination (e.g., professional knowledge). In addition, some grades reflected the average of several grades assigned during the semester, while others were derived solely from the final examination. The subcomponent grades were as follows:

2 As each dimension of the TIPI only consists of two items, the alpha values are particularly low. Storme et al. (2016) reported Cronbach's alpha values of .39 and .40, for example.

– General knowledge, referring to culture and common knowledge taught at school, was attributed by the school.

– Professional knowledge education, referring to the specific knowledge taught at school regarding the future profession, was attributed to apprentices by the school.

– Professional knowledge, referring to the final examination of the professional branches as part of the qualification for the professional domain, was attributed by the training company.

– Practical work, which refers to the final examination that takes place at the training company, was attributed by the training company.

– Practical training (only for the social care apprentices) referred to the grade obtained at the training company.

– Professional experience (only for the social care apprentices), which refers to the mean grade calculated from several evaluations of the knowledge acquired in the professional field, was attributed by the training company.

To provide the best possible account of the two facets of the dual training (i.e., at school and the training company), we opted for the professional knowledge education and practical work grades. The first grade reflects the theoretical knowledge of the profession learned at school, while the second corresponds to the practical knowledge acquired in the training company.

3 Results

In the first set of analyses, we calculated the correlations between the different variables such as EI as ability, EI as personality trait and school engagement considered in this study (see Table 1). Among them, and as stated in the literature, we observed a non-significant correlation between trait and ability EI, but significant correlations between both types of EI and VET grades. More specifically, ability EI correlated in a positive way with professional knowledge education grade, whereas trait EI positively correlated with practical work grade. Additionally, ability EI (i.e., STEU short form) correlated significantly and positively with classical intelligence (i.e., RSPM), as already reported in the literature (Olderbak et al., 2018).

Table 1: Correlations Between Variables Used in the Study

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
1. Age	--																			
2. Occupation†	.45**	--																		
3. Sex	.01	-.06	--																	
4. Score STEU-Ability EI	.06	.04	-.10	--																
5. Score TIPI-Extrav	-.12	-.03	.14	-.01	--															
6. Score TIPI-Agree	-.02	.01	.12	-.06	.03	--														
7. Score TIPI-Consc	.03	-.04	.10	-.06	-.01	.34**	--													
8. Score TIPI-Emot	-.22*	-.03	-.14	.08	.01	.25*	.19	--												
9. Score TIPI-Open	-.02	-.01	-.14	.26*	.13	.24*	.01	.10	--											
10. Score Raven-« Classical intelligence »	-.08	-.08	.01	.30**	-.08	.01	-.12	.01	.09	--										
11. Score TEIQue-Trait EI	-.11	-.01	-.10	.05	.24*	.34**	.31**	.61**	.40**	-.08	--									
12. Score learning engagement	-.16	-.31**	.04	.03	.08	.15	.21*	.27*	-.02	-.14	.39**	--								
13. Score school engagement	-.05	.10	-.17	.00	.23*	.26*	.27**	.24*	.09	-.10	.36**	.39**	--							
14. Global grade	.12	-.03	.23*	.24*	.00	.12	.16	.07	-.04	.06	.18	.23*	.04	--						
15. General knowledge grade	-.14	-.16	.16	.11	-.14	-.02	.14	.11	-.22	-.05	.05	.11	-.13	.71**	--					
16. Practical work grade	-.08	-.32**	.18	.15	.05	.15	.12	.05	.04	.02	.21*	.29**	.07	.68**	.24*	--				
17. Professional knowledge grade	.29**	.32**	-.08	.20	-.01	-.07	-.01	.01	.03	.17	-.03	-.01	.04	.40**	.26*	-.27**	--			
18. Professional knowledge education grade	.27*	.21*	.19	.21*	.05	.13	.22	.12	-.04	-.04	.14	.15	.20	.69**	.60**	.15	.59**	--		
19. Practical training grade+	.13	-	.33*	.11	.07	.20	.22	.23	.06	.03	.41**	.14	-.02	.57**	.33*	.53**	-.05	.11	--	
20. Experience grade+	.17	-	.26	.10	.15	.29*	.42**	.33*	.01	-.05	.44**	.30*	.16	.80**	.54**	.53**	.21*	.68**	.80**	--

Note: *: $p < .05$; **: $p < .01$. †: 0=Healthcare; 1=Social. +: only social care apprentices

According to Chamorro-Premuzic et al. (2007), trait EI (i.e., TEIQue) has positive correlations with all five personality traits measured and grades as well. In light of these preliminary results, we focus here on the respective roles of the two types of EIs in explaining the different grades obtained in a complementary way.

3.1 Influence of Trait and Ability EI on Grades Through Engagement

To test hypotheses 1a and 1b, we conducted two distinct mediation models. To determine the mediating role of engagement between EI and grades, we opted for school engagement in the model with ability EI and professional knowledge education grade and learning engagement in the model between trait EI and practical work grade.

Data analyses were realized using the mediation model 4 from IBM SPSS 2022 PROCESS by Hayes (2013) with 5'000 bootstraps. First, we tested the mediator role of school engagement in the relationship between ability EI and professional knowledge education grade, with intelligence as a covariate. Presented in Figure 2 is the model describing the mediation of engagement at school between ability EI and professional knowledge education grade. Ability EI has no significant association with school engagement (a = .00, t(88) = .03, p = .97). However, school engagement marginally influences theoretical grade (b = .20, t(87) = 1.94, p = .06; see Figure 2). In contrast, the direct effect of ability EI on professional knowledge education grade is significant (c' = .24, t(87) = 2.25, p = .03), as is its total effect (c = .24, t(88) = 2.23, p = .03). As the indirect effect is not significant (a path is not significant), the total effect is only due to the direct effect of ability EI on professional knowledge education grade.

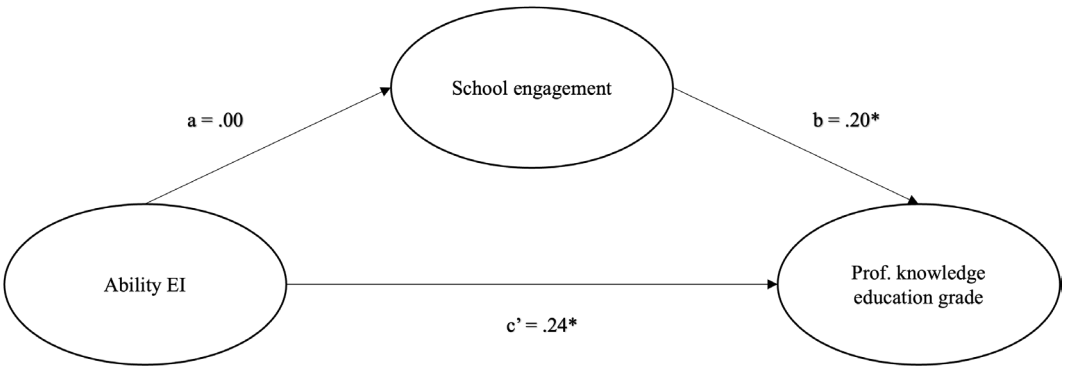

Figure 2: Mediation Model Testing the Mediator Effect of the School Engagement on the Influence of Ability EI on the Professional Knowledge Education Grade (Hypothesis 1a)

In the second mediation model, we tested hypothesis 1b, that is, engagement in learning mediates the relationship between trait EI and practical work grade, with personality traits acting as covariates. Presented in Figure 3 is this mediation model, wherein trait EI significantly influences the mediator engagement with learning (a = .45, t (85) = 3.04, p < .001). Moreover, engagement in learning significantly influences practical work grade (b = .23, t(84) = 2.04, p = .04; see Figure 3). The direct effect of trait EI is not significant (c' = .20, t(84) = 1.22, p = .23), whereas its indirect effect is significant (ab =.10, bootstrapped confidence interval between .00 and .24), which speaks for a full mediation of engagement in learning between trait EI and practical work grade. The total effect is marginally significant (c = .31, t(87) = 1.92, p = .06).

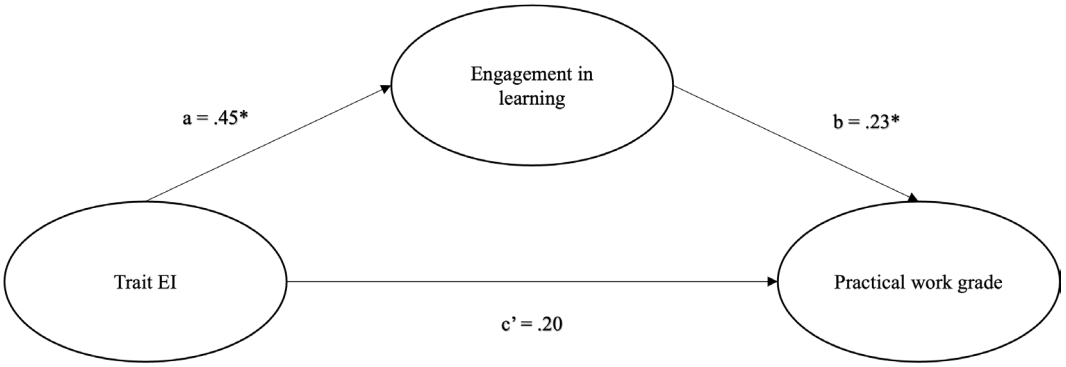

Figure 3: Mediation Model Testing the Mediator Effect of the Engagement in Learning on the Influence of Trait EI on the Practical Work Grade (Hypothesis 1b)

3.2 Influence of Trait and Ability EI on Different Types of Grades

To test hypothesis 2, which refers to ability and trait EI predicting different components of grades, we employed an extreme groups approach and compared high trait EI vs. low trait EI groups, as well as high ability EI vs. low ability EI groups. More specifically, participants included in the high trait EI group scored above the 75th percentile of the TEIQue scale, whereas participants included in the low trait EI scored under the 25th percentile of the same scale. The same criteria were used to create the two high ability EI vs. low ability EI groups using STEU. Regarding the high vs. low ability EI groups, our sample was composed of 52 participants (45 women and 7 men, M = 21.67, SD = 0.37), while for the high trait-EI vs. low trait-EI groups, our sample consisted of 45 participants (36 women and 9 men, M = 21.89, SD = 0.37).

Results from the one-way ANOVA showed that participants in the high ability EI group scored significantly higher in the cognitive Raven test (M = 21.20, SD = 2.80) than participants in the low ability EI group (M = 18.48, SD = 3.62; $F(1, 50) = 9.07$, $p = .01$, $\eta^2_p = .15$). Regarding grades, participants in the high ability EI group had significantly higher global grades ($M = 5.10$[3], $SD = .33$) than participants in the low ability EI group ($M = 4.82$, $SD = .32$; $F(1, 50) = 9.52$, $p = .01$, $\eta^2 p = .16$). Moreover, we observed that participants in the high ability EI group scored significantly higher in grades evaluating professional knowledge ($M = 4.64$, $SD = .56$) than participants in the low ability EI group ($M = 4.33$, $SD = .54$; $F(1, 50) = 4.12$, $p = .03$, $\eta^2_p = .08$; see Figure 4).

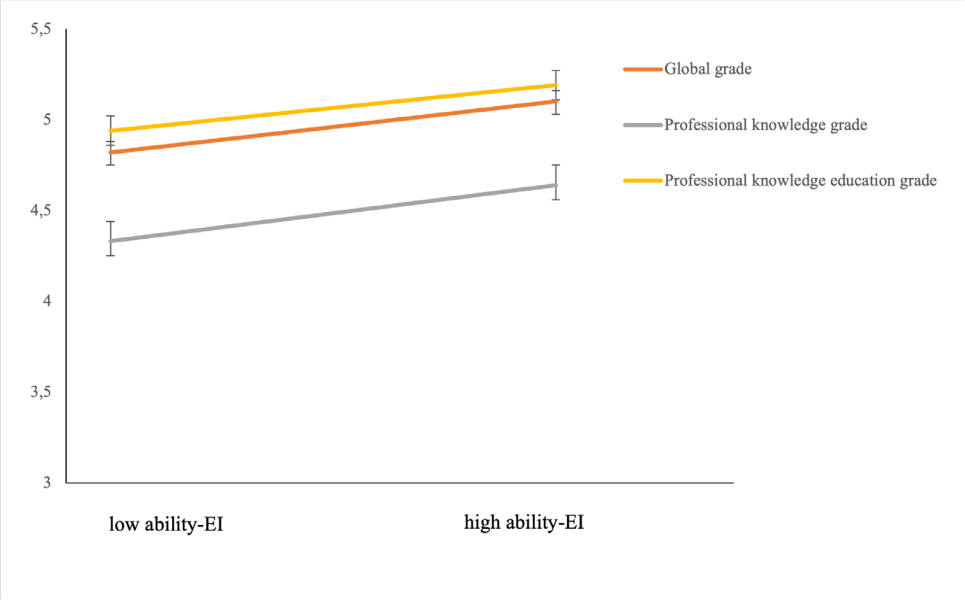

Figure 4: Means and Standard Errors of the Final, Professional Knowledge and Professional Knowledge Education Grades From Apprentices in High Ability-EI vs. Low Ability-EI Groups (Hypothesis 2)

We observed the same significant pattern with the grades evaluating professional knowledge education: Participants in the high ability EI group scored significantly higher (M = 5.19, SD = .41) than participants in the low ability EI group (M = 4.94, SD = .39; $F(1, 49) = 4.62$, $p = .04$, $\eta^2_p = .09$). In addition, the ANOVA results showed that participants in the high ability EI group scored significantly higher general knowledge grades (M = 5.27, SD = .44) than participants in the low ability EI group ($M = 4.97$, $SD = .37$; $F(1, 49) = 5.21$, $p = .03$, $\eta^2_p = .13$). ANOVA results for the non-significant effects are depicted in Table 2.

3 The grading system in Switzerland ranges from 0 to 6.

Table 2: Means, Standard Deviations and Confidence Intervals of Participants With Low vs. High EI as Ability

	Low ability-EI (n=27)			High ability-EI (n=25)			F	η²
	M	*SD*	*CI*	*M*	*SD*	*CI*		
Learning Engagement	19.52	3.15	[18.27, 20.77]	19.64	2.12	[18.77, 20.51]	.03	.00
School Engagement	26.70	4.04	[25.11, 28.30]	25.40	4.96	[23.35, 27.45]	1.09	.02
Class Engagement	23.48	3.66	[22.03, 24.93]	23.64	3.19	[22.32, 24.96]	.03	.00
Sum Engagement	67.59	7.61	[64.58, 70.60]	67.20	6.13	[64.67, 69.73]	.04	.00
General Knowledge Grade	4.97	0.37	[4.80, 5.13]	5.27	0.44	[5.04, 5.50]	5.21*	.13
Practical Work Grade	5.00	0.81	[4.67, 5.32]	5.32	0.59	[5.07, 5.56]	2.58	.05
Practical Training Grade[1]	5.14	0.46	[4.88, 5.41]	5.43	0.33	[5.24, 5.62]	3.59(*)	.12
Professional Experience Grade[1]	5.08	0.27	[4.92, 5.23]	5.23	0.28	[5.07, 5.39]	2.08	.07

Note: [1]: both groups n=14; (*): .05<p<.07; *: p<.05; **: p<.01; ***: p<.001

The same analyses were carried out based on TEIQue scores. These results showed that the participants in the high trait EI group scored significantly higher grades evaluating practical work (M = 5.41, SD = .52) than participants in the low trait EI group (M = 5.02, SD = .65; $F(1, 44) = 4.43$, $p = .04$, $\eta^2_p = .09$; see Figure 5).

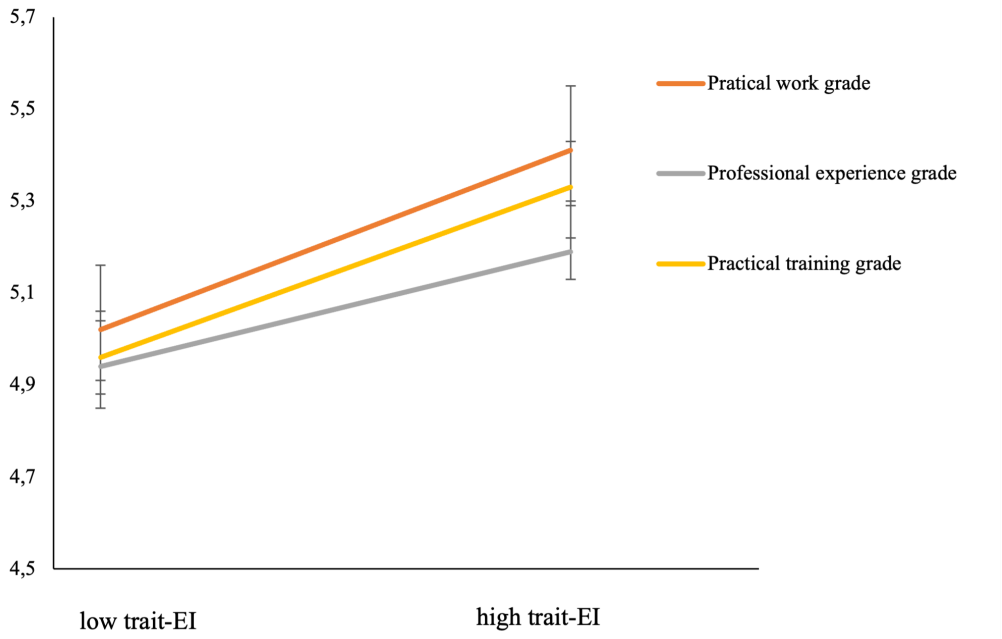

Figure 5: Means and Standard Errors of Practical Work, and Professional Experience, and Practical Training Grades From Apprentices in High Ability-EI vs. Low Ability-EI Groups (Hypothesis 2)

We observed that participants in the high trait EI group scored significantly higher grades evaluating professional experience (M = 5.19, SD = .20) than participants in the low ability EI group (M = 4.94, SD = .34; $F(1, 22) = 4.86$, $p = .04$, $\eta^2_p = .18$), as well as grades evaluating practical training (M = 5.33, SD = .39 vs. M = 4.96, SD = .33; $F(1, 22) = 6.41$, $p = .02$, $\eta^2_p = .23$). The overall results support the association of ability EI with more theoretical grades and trait EI with more practical grades, in line with hypothesis 2. The ANOVA results for the non-significant effects are depicted in Table 3.

Table 3: Means, Standard Deviations and Confidence Intervals of Participants With Low vs. High EI as Trait

	Low trait-EI (n=24)			High trait-EI (n=21)			F	η^2_p
	M	*SD*	*CI*	*M*	*SD*	*CI*		
"Classical" Intelligence (Raven)	20.04	3.88	[18.40, 21,68]	19.48	3.83	[17.73, 21.22]	0.24	.01
Global Grade	4.92	0.34	[4.77, 5.06]	5.04	0.30	[4.91, 5.18]	1.69	.04
General Knowledge Grade	5.16	0.44	[4.96, 5.37]	5.14	0.37	[4.95, 5.33]	0.20	.00
Professional Knowledge Grade	4.52	0.62	[4.26, 4.78]	4.45	0.50	[4.22, 4.68]	0.19	.00
Professional Knowledge Education Grade	5.05	0.45	[4.86, 5.25]	5.05	0.44	[4.85, 5.25]	<.01	.00

Note: (*): .05<p<.07;*: p<.05;**: p<.01;***: p<.001

3.3 Influence of EI as an Ability and Personality Trait on Engagement

To test the influence of EI on engagement, we conducted a one-way ANOVA comparing the groups low ability EI vs. high ability EI. The results indicated that ability EI has no significant effect on the different types of engagements (global, learning, school, and class engagement; *ps* >.30; see Table 2).

We conducted the same analysis with trait EI. The results showed that participants in the high trait EI group were significantly more engaged (global score in engagement scale) (M = 25.95, SD = 3.84) than participants in the low trait EI group (M = 21.54, SD = 3.64; $F(1, 44) = 15.64$, $p < .001$, $\eta^2_p = .27$). Moreover, participants in the high trait EI group were significantly more engaged in learning (M = 21.57, SD = 2.31) than participants in the low trait EI group (M = 18.83, SD = 1.86; $F(1, 44) = 19.36$, $p < .001$, $\eta^2_p = .31$). The results showed as well that participants in the high trait EI group were significantly more engaged in school (M = 28.67, SD = 4.70) than participants in the low trait EI group (M = 23.79, SD = 5.27; $F(1, 44) = 10.57$, $p < .001$, $\eta^2_p = .20$). We observed a similar significant effect on class engagement score, with participants in the high trait EI group significantly more engaged in class (M = 25.95, SD = 3.84) than participants in the low trait EI group (M = 21.54, SD = 3.64; $F(1, 44) = 15.64$, $p < .001$, $\eta^2_p = .27$).

4 Discussion

The present study aimed to test the influence of EI as an ability and personality trait on dual-training achievement. Our results confirm our hypotheses, supporting the positive influence of ability and trait EI on complementary aspects of VET achievement. Specifically, our findings show that ability and trait EI account for grades on top of classical intelligence and personality, which are known to be good predictors of school achievement (MacCann et al., 2020). Our results from the mediation analysis also show that ability EI is directly associated with the more theoretical part of grades, such as general knowledge. Furthermore, the analyses conducted on the two groups of high and low EI scores show that the two forms of EI explain different grades in a complementary way: Ability EI is more related to academic and theoretical grades, while trait EI explains more practical, job-related grades (see Figures 4 and 5). These new results demonstrate the specific roles of EI as an ability and personality trait on grades and school achievement in the VET context.

Moreover, we observed a marginal relationship between school engagement and professional knowledge education grades, demonstrating a tendential mediator effect of school engagement between ability EI and theoretical grades. Our analysis does not reveal a significant association between ability EI and school engagement, however, which does not allow us to entirely confirm the mediation of ability EI and school engagement on theoretical grades

(see Figure 2). Even so, these results highlight the important role of engagement at school and, more generally, in global school achievement. Our second mediation analysis shows that trait EI significantly accounts for the practical component of grades. As predicted, this link is completely mediated by engagement in learning, with results indicating engagement in learning's complete mediation of the relationship between trait EI and practical grades (see Figure 3).

These results demonstrate the significant role of the three different axes of engagement for school achievement through EI, confirming previous research (Peetsma, 1992). However, this new study engages the discussion of the joint role of EI and engagement on training achievement. The positive association between these two concepts deserves a better understanding of how EI may be a crucial antecedent of engagement at school in general. It is thus necessary to further investigate how EI as an ability and personality trait plays a role in how apprentices engage and motivate themselves to earn better grades and thus succeed in their training.

Although our study revealed the important role of engagement on school achievement, one of its limitations concerns the preferred division for engagement, namely at school, in the classroom, and in learning. The latter, although theorized in the literature (Skinner & Pitzer, 2012), could be understood according to the most common theories that consider three components of engagement: Affective, behavioral, and cognitive (Lam et al., 2014; Lei et al., 2018). Additionally, in our study, we only considered the school aspects of engagement, whereas in dual VET, professional engagement is just as if not more important than school engagement (Wenger et al., 2021). It is therefore important and necessary in future investigations to include both forms of engagement in a survey to observe whether and to what extent they actually contribute to the success of a course. Another important limitation is the low reliability level, as measured by the Cronbach's alpha value of the ability EI measure (STEU). Although there is generalized consensus that this does not imply that situational judgment tests are unreliable (Libbrecht & Lievens, 2012), a replication of this study might provide further evidence that defends the results already obtained.

Moreover, our findings revealed a significant association between ability EI and Raven scores, which represent classical intelligence (Raven & Court, 1998). This is consistent with previous research showing that ability EI is more associated with classical intelligence and cognitive aptitudes, while EI as a personality trait reflects "savoir-être" (Lanciano & Curci, 2014). Our new results clearly showed a link between ability EI and the more theoretical part of professional training, such as professional knowledge education.

5 Conclusion

To conclude, our study confirms the positive role of EI as an ability and personality trait on school achievement in health and social training program. By providing more evidence of the importance of EI in VET, these new results open the question of how to better consider the influence of EI in the VET context. An important concern considers the distinction between higher versus lower apprentices' EI, which can add a selection criterion for future apprentices according to their EI potential. This concern could be solved by offering courses dedicated to training apprentices instead of using them as selection tools. Indeed, several studies have demonstrated that EI can be trained (Brackett & Katulak, 2013; Dugue et al., 2021), and programs already exist for this purpose. Subsequently, it would be interesting to carry out a similar study in professional contexts other than social work and healthcare. This would allow us to verify whether ability and trait EI are equally explanatory of achievement in VET. More specifically, we would like to observe whether EI still plays a prominent role in explaining training completion in professional fields where the relationship with others is a less central aspect of professional achievement. This already seems to be the case in hospitality management education (Völker et al., 2023), which is a promising indicator of further findings in this direction.

Moreover, these new results reveal the important role of engagement in the school context. Although the link between EI (as an ability and personality trait) and engagement needs to be further investigated, there is enough evidence to include this component in future studies and training programs.

In terms of implications for the field, our study could lead to the redesign or development of the training curricula in the social and healthcare professions. In concrete terms, this could imply providing training on social and emotional skills to vocational school teachers and continuing education to supervisors (i.e., teachers and in-company trainers) on the subject of EI. Although the latter is already present in social and healthcare curricula, it is neither explicit nor formalized and should therefore be made so. This should make all those involved in VET more aware of the central role of EI in training achievement.

Ethics Statement

This study was conducted in accordance with principles for human experimentation as defined in the Declaration of Helsinki. Informed consent was obtained from all participants included in the study.

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