



Exploring factors influencing high school graduates' decision to become technical teachers: A quantitative analysis

Esther Pokuah¹, Robert Kweku Markin², Isaac Bengre Taley^{3*}

^{1&2}Department of Technical and Vocational Education, Mampong Technical College of Education, Ghana.

bowesgah@yahoo.com¹, kmarkin@yahoo.com²

^{3*}Department of Mathematics and ICT Education, Mampong Technical College of Education, Ghana.

ibtaley@mtce.edu.gh

*Corresponding author: ibtaley@mtce.edu.gh



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ABSTRACT

Understanding why high school graduates with or without technical-subject backgrounds opt to become technical teachers at the expense of their graduating grade has become a puzzle to technical teacher educators. Although the literature suggests that interest and prior knowledge could explain a person's choice of academic pursuit, these submissions remain speculations in technical education. This study, therefore, used quantitative data from 119 pre-service technical teachers to examine the relationship between situational interest, realisation competence, high school technical-subject background knowledge, and age. The study showed that on average pre-service technical teachers demonstrated an outstanding level of realisation competence but a moderate situational interest in design and realisation courses. Generally, moderate to high levels of correlation was observed between realisation competence, situational interest, and age. Furthermore, the combined effect of situational interest, age, and high school background knowledge predicted about 34.2% of the variance in realisation competence. Nonetheless, situational interest was the primary predictor, while high school background knowledge was not a significant predictor. Additionally, the study showed that pre-service teachers with high school technical-subject backgrounds outperformed their peers without high school technical knowledge in situational interest rating and realisation competence.

Keywords: Pre-service technical teachers, Realisation competence, Situational interest, Technical-subject background

1. INTRODUCTION

There is a shortage of qualified teachers in Ghana across school subjects (Cobbold, 2015). This shortage can include technical teachers. In particular, the shortage occurs at the Junior High School (JHS) level, where the subject of Career Technology (previously Basic Design and Technology) is compulsory for all students. Whereas teacher deficits still exist, Ghana's Ministry of Education (MoE) has unveiled an ambitious educational policy to expand technical education through the Technical and Vocational Education and Training (TVET) programme (Ministry of Education [MoE], 2021). The advent of the TVET programme and Ghana Education Service's (GES) continuous demand for technical teachers call for the training of more technical teachers. It is for this reason, that the Commission of TVET (CTVET) was established to accelerate the training of quantity and quality of teachers for TVET institutions in Ghana (MoE, 2021: 35). The inability of training institutions to turn-out more TVET teachers puts the ambition of the MoE and GES in limbo. Notably, the shortage in the training of technical teachers can be attributed to the small number of pre-service teachers who apply for training as technical teachers. Only a few senior high/technical school students who have studied technical courses possess the required entry into technical colleges of education. Even with these few numbers, not all such qualified candidates apply to become technical teachers.

To this end, managers of technical colleges of education (with approval from their Governing Councils) have liberalised the entry requirement for Pre-Service Technical Education to admit students who did not study technical courses at the senior high school. Of paramount interest is that Mampong Technical College of Education (MTCE) has positioned itself as a single College that trains most technical teachers for Basic schools in Ghana. Despite MTCE being the preferred choice for many male technical high school graduates, technical education teacher trainers (Tutors) have consistently complained about the competency level of PTTs in realising artifacts. A ready reason that tutors usually refer to regarding the competency of PTTs in the realisation of artifacts is their high school technical-subject background. Notably, the technical programme in MTCE is available to PTTs who have studied technical related subjects or have not studied technical related subjects at the high school. Thus, at MTCE, high school technical knowledge is not a compulsory requirement for admission. Students' interest in technical education as well as their advancement in age most likely attract them to pursue the technical option. This is because as students age, they seek opportunities to create wealth (Cornell, 2001). Arguably, some of these PTTs are bread winners in their families. To it, they turn to study courses which are practically related to the job market. Besides, as students advance in age, they become more independent and may start thinking about their future careers and financial goals. With the practical nature of the technical programme at MTCE, the speculation becomes ripe that age might be a pulling factor attracting students to opt for the technical programme. Similar to other TVET tertiary training institutions, PTTs can be enterprising and self-reliant alongside professional teacher training because MTCE prioritises the acquisition of skills in the delivery of TVET courses. That notwithstanding, there is a proposition in literature (Bhandari et al., 2019) that interest experienced by trainees in a practical training environment turn to reduce with advancement in age.

At MTCE, PTTs undertake several technical courses. One such important course is design and realisation, which has two different components (Folio and Realization) and is studied at three different levels. The design and realisation course is structured to equip PTTs with competencies of designing (known as a folio) and realisation (artifact) processes. The folio helps PTTs to explore the nature of relevant tools and materials used in the design process. It also describes situations from which problems are identified and analysed to ensure that relevant designs are developed through graphical expressions to solve problems in the Technology industries. The realisation is then taught to equip PTTs with skills in producing artifacts. PTTs demonstrate the stock of competence accrued during the study period at the final semester when they realise a masterpiece of folios and artifacts (hereafter, called realization competence).

The preceding deductions open for speculation about the pulling factors attracting students to enrol in the technical teacher programme as pre-service technical teachers. While these submissions remain speculations, there is no empirical study to verify them. This study examined the relationship between PTTs' interest, the realisation of artifacts and folio, high school technical-subject background knowledge, and age to address this literature gap. Specifically, we intended to relate PTTs' interests with their achievement (realization competence) taking into consideration their high school technical-subject background. Since interest is a long-time trait and nothing like general interest exist (Frenzel et al., 2010), we examined the situational interest (SI) of PTTs in the design and realisation course. Earlier, Tobias (1994) has admonished that given the close connection between background knowledge and SI, an attempt should be made to determine their independent effects by statistically partially eliminating the influence of background knowledge. Nevertheless, researchers in technical education are yet to respond to this age-old call by Tobias (Tobias, 1994).

Based on the purpose of this study, we attempted to answer three research questions (RQ) as follows:

1. RQ1. How well does the SI and realisation competence of PTTs correlate?
2. RQ2. What is the effect of PTT's high school technical-subject background and SI on realisation competence?
3. RQ3. To what extent do PTT's SI and realisation competence differ in their high school technical-subject background knowledge?

Combining SI with other factors, such as age and high school technical-subject background might help explain PTTs' realisation competence. This is due to Rotgans' (2009) suggestion that a mere interest might not influence a student's performance in a technical-related subject without other effective characteristic behaviours.

2. LITERATURE REVIEW

Motivation can be described in different variables. It can be emotionally driven by the individual or influenced by situations in which the individual finds. Modern motivation researchers (Bai et al., 2022) posit that interest is a motivational variable that describes a person's engagement with various activities. However, researchers (Bhandari et al., 2019; Hong et al., 2019; Linnenbrink-Garcia et al., 2010) have distinguished between situationally driven personal interest in a topic or activity at a particular time (situational interest, SI) and habituated personal interest (individual interest) that an individual has in a topic or activity. Contrary to individual interest, Ding et al. (2013) added that situational interest (SI) is thought to be temporary, environmentally activated, and context-specific and emerges from learners recognizing the enticing aspects of a particular learning assignment. In this regard, these researchers enact parallel connections between learners' interests and ability to perform assignments. Agreeably, it is common to find learners completing assignments in courses of their interest than for those they lack interest.

For this reason, Rotgans and Schmidt (2011) also explained SI as an immediate emotional response to specific circumstances or stimuli in the learning environment that directs one's attention to the task such that this interest may or may not endure over time. To this end, Frenzel et al. (2010) viewed interest as context-dependent, and there is no such thing as common student interest. Accordingly, individual interest remains typically steady over time, while it can alter over more extended periods, unlike SI, which can fluctuate from moment to moment.

Although Rotgans and Schmidt (2011) recognise a potential challenge in relating SI to academic achievement, it is common knowledge that a learner interested in a particular topic will engage with it more thoroughly than a learner who is less interested in the topic. Academic achievement should increase with greater engagement, which entails devoting more time and effort to the subject. In an active-learning classroom, Rotgans and Schmidt (2011) examined how situational interest related to academic performance. During a one-day, problem-based learning session, 69 polytechnic students were given five measures of situational interest. The findings showed that situational interest was a significant predictor of observed classroom behaviours related to achievement, which proved to be a substantial predictor of academic achievement.

Elsewhere, SI positively relates to science competence (Linnenbrink-Garcia et al., 2013). This is because SI acting with other affect variables significantly predicts students' achievement, engagement, and subsequent career choices (Wigfield & Eccles, 2002). Moreso, Hong et al. (2019) found that SI affects individual performance even in technologically related competition. According to Tobias (1994), SI and prior knowledge have a strong linear correlation. People tend to have more excellent knowledge than others on subjects linked to their areas of interest. Tobias (1994) tries to differentiate between the impacts of interest and prior knowledge. According to Dochy (1992) (as cited in Tobias, 1994, p. 39), previous knowledge (synonymous with background knowledge) overrides all other variables and accounts for between 30 and 60 percent of the variance in research results. As Tobias (1994) argued, believing there is little link between previous knowledge and SI appears irrational. This is because people with high SI have probably learned more and are more likely to spend a lot more time engaging in activities relevant to that field than people with less SI. To it, Okolie et al. (2021) argue that the situational interest people experience pushes them to understand the knowledge gap between what they already know and what they want to know. When put together, it appears that SI triggered a more comprehensive network of relevant, personal experiences than background knowledge and sparked more pleasurable competence (Palmer et al., 2016; Tobias, 1994).

3. RESEARCH METHOD

3.1. Research design

To ascertain students' SI and realization competence in technical education, this study used a cross-sectional approach as its research design. This study's design enabled the use of closed-ended questionnaires and scoring rubrics to gather sufficient data within the shortest possible time. Survey participants are noted to provide cross-sectional data in a relatively short amount of time (Lavrakas, 2008). Using the questionnaires and the rubrics, we gathered data from PTTs with varying previous knowledge in technical education. Consequently, we answered the research questions posed.

3.2. Participants

The participants for this study included 119 PTTs from MTCE. All 119 PTTs were in the final semester of their study. As part of their graduation requirement, they needed to produce an artifact to justify their realization of competence. The Census technique was adopted to select all 55 PTTs with high school technical-subject backgrounds before admission. Besides, simple random sampling was used to sample 64 PTTs who did not have a high school technical-subject background before admission. Although participation in this study was voluntary, participants signed the informed consent form following the assurance of confidentiality of their responses and the anonymity of their identity in this study. The Ethical Clearance Unit of MTCE provided ethical clearance for data collection in this study.

3.3. Instrumentation

Regarding data collection on the construct of situational interest, previous studies used varied approaches such as collecting data during a learning session (Palmer, 2009), after learning sessions (Lin et al., 2013; Linnenbrink-Garcia et al., 2013), or both (Palmer et al., 2016) depending on the motives. The present study aimed to uncover the underlying sources of situational interest and tie their situational interest to their end-of-study performance. Additionally, it was determined to collect the data after the learning experiences rather than interrupting the learning session, which could also disrupt the natural flow of students' thoughts and feelings throughout the session. Therefore, students needed to complete the course of study before reviewing their reflections. So, right after the coursework and before their artifacts were evaluated for realisation competence, a closed-ended situational interest questionnaire (see Appendix A) was administered, and students' artifacts realised were scored using a scoring rubric (see Appendix B) to gather quantitative data.

Rotgans and Schmidt's (2009) six-item situational interest scale, which was scored on a 5-point Likert scale: 1 (not true at all), 2 (not true for me), 3 (neutral), 4 (true for me), and 5 (very true for me) was adapted to determine students' SI. Previous studies have established the construct validity (Rotgans & Schmidt, 2009) and the reliability of the SI scale (Rotgans & Schmidt, 2011). Hence, the psychometric characteristics of SI measures were adequate and appropriate. A scoring rubric (Design and realisation marking scheme) was adopted from the Institute of Education (IoE) was used to evaluate the PTTs project realisation (realization competence). The assessment criteria for the artifacts produced by the PTTs met the requirements for task descriptions, standards, and quality. Hence, the scores produced met the requirements of criterion-referencing. Besides, to achieve reliable realisation competency scores, one of us (co-author) and another technical educationist (an experienced technical external examiner) inter-rated 12 (about 10%, which is in line with O'Connor and Joffe (2020)) of the total scores. The inter-rated reliability proxied by the intra-class reliability score was adequate using Landis and Koch (1977) benchmark. The average measure of intra-class correlations (ICC) between the two raters on the realisation score was .824 with a 95% confidence interval from .555 to .930 ($F(19, 19) = 5.674, p < .001$). Similarly, the average measure of intra-class correlations (ICC) between the two raters on the folio score was .979 with a 95% confidence interval from .946 to .991 ($F(19, 19) = 46.529, p < .001$). In contrast, the average measure of intra-class correlations (ICC) between the two raters on the artifacts score was .674 with a 95% confidence interval from .177 to .871 ($F(19, 19) = 3.072, p < .05$). Since the intra-class correlation coefficients were good, the co-author went ahead to score the remainder of the folio and artifacts. In addition to the SI data and the realisation skill scores, PTTs' ages were collected.

4. DATA ANALYSIS

4.1. Preliminary Analysis

To ascertain the validity and reliability of the factor structure of the situational interest scale used in this study, we performed exploratory and confirmatory factor analysis in Amos 21, which allowed us to reduce the number of items by removing those with factor loadings below 0.50 (Zainudin, 2012). A single-dimension situational interest construct was extracted and named accordingly. A good model fit was achieved: total variance extracted = 60.4%, KMO = .774, Bartlett's Test of Sphericity $\chi^2 = 731.275, df = 21$ at Sig = .000. Communalities extraction for each of the seven items on the situational interest scale was at least .372. Cronbach alpha (α), the composite reliability (CR), and the average variance extracted (AVE) were used to check respectively for internal consistency, reliability, and convergent validity ($N=7, \alpha=.859, CR=.895, AVE=.554$). With an AVE and CR for each construct greater than .4 and .6, respectively, convergent validities

were met (Hair et al., 2017). The factor loadings for each item were between .610 and .872. In addition, the situational interest rating was relatively high ($M = 3.22$, $SD = .566$), about 80.5%. The Realisation competence scores was very good ($M = 76.19$, $SD = 4.543$). The average age of the PTT was 26 years.

4.2. Results

Subsequently, we discussed the results of the study in line with the research questions.

4.3. Relating situational interest and age of PTTs to their realisation competence

Prior to examining the correlation measures, the mean (M), standard deviation (SD), and coefficient of variations (CV) were computed. The data showed that the mean SI was moderate ($M = 3.22$, $SD = .566$, 64.4%) while the realisation competency ($M = 76.19$, $SD = 4.543$) could best be described as very good. On the average, the age of the PTTs was high ($M = 26$, $SD = 3.034$). A correlation analysis was carried out to determine the correlation between the variables situational interest, age, and realisation competence (RQ1). Table 1 displays the findings of the correlation analysis. Cohen's (1988) benchmark was used to calculate the correlation's strength (small, $r = .1$, moderate, $r = .3$, and large, $r = .5$).

Table 1: Correlation measures and descriptive ($N = 119$)

Factors	1	2	3	4	5	M	SD	CV
SI						3.22	.566	17.58
Realisation	.537**					76.19	4.543	5.96
Folio	.422**	.812**				75.43	5.276	6.99
Artefact	.466**	.842**	.368**			76.94	5.705	7.41
Age	.461**	.471**	.501**	.286**		25.78	3.034	11.77

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Putting all PTTs together (Table 1), the correlation between realisation competence and SI, realisation competence and age, and between SI and age were all positive and statistically significant. Also, the two realization competence constructs, folio and artifact, correlated positively and significantly with SI and age. Using Cohen's (1988) benchmark, the levels of correlation ranged from moderate to high. While controlling for high school technical-subject background knowledge, as presented in Table 2, all statistical correlation measures were significant for PTTs with high school technical-subject background (Table 2). However, for PTTs without high school technical-subject backgrounds ($N = 64$), age did not significantly correlate with realisation competence, folio, and artifact scores. Similarly, PPTs' SI did not correlate with their folio scores (Table 2).

Table 2: Correlation measures for PTTs with and without high school technical-subject background

Factors		1	2	3	4	5
Without high school technical-subject background ($N = 64$)	Realisation					
	Folio	.769**				
	Artefact	.818**	.261*			
	SI	.430**	.209	.461**		
	Age	.120	.228	-.024	.351**	
With high school technical-subject background ($N = 55$)	Realisation					
	Folio	.832**				
	Artefact	.853**	.420**			
	SI	.601**	.593**	.424**		
	Age	.605**	.617**	.408**	.507**	

** . Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

4.4. Effects of entry background knowledge and situational interest on realisation competence

A multiple standard regression model was applied to assess the regression of entry background and situational interest in PTTs' realisation competence. Prior to the analysis, all assumptions underlying regression analysis as proposed by Pallant (2011) (that is, multicollinearity, normality, outliers, linearity, homoscedasticity, and independence of residuals) were satisfied.

Table 3: Standard Multiple Regression results of SI, age and high school technical-subject background

Factors	B	SE	T	Sig.	95% CI	Tolerance
Intercept	55.441	3.024	18.331	.000	11.99	
SI	3.295	.678	4.858	.000	2.69	.782
Age	.398	.129	3.086	.003	.51	.750
High sch tech subject Background	1.249	.876	1.426	.157	3.47	.896
<i>Model fit</i>						
R ²	.364					
Adjusted R ²	.342					
F	16.303					
P	.000					

Note: SE Standard Error, CI = Confidence Interval

The results of the regression model, as presented in Table 3 was statistically significant $F(4, 118) = 16.303, p < .001$. The combined effect of PTTs SI, age, background knowledge explained about 36.4% ($R^2 = .364$, Adjusted $R^2 = .342$) of variance in realisation competence. In-depth enquiry revealed that both SI and age were statistically significant and contributed positively towards PTT realisation competence. Moreover, situational interest was the major predictor ($\beta = .410, t = 4.858, p < .001$) while age was the least predictor ($\beta = .266, t = .266, p < .001$). Nonetheless, the background knowledge, at the senior high school was not a significant predictor of PTTs realisation competence.

4.5. Significant differences in pre-service technical teachers' situational interest and realisation competence

To examine the to which PTTs with or without high school technical-subject background differed on their SI and realization competence (RQ 4), An independent-samples t-test was conducted. After satisfying underlying assumptions of independent-sample t-test testing, we found that with Levene's Test for equality of variance significant ($F = .361, p = .549$), the difference in the SI of PTTs with high school technical-subject background ($M = 3.436, SD = .491, N = 55$) and PTTs without high school technical-subject background ($M = 3.036, SD = .563, N = 64$) was statistically significant ($t(117) = 4.101, p < .001$, two tailed). At an observed power of 98.2%, the magnitude of the differences in the means (mean difference = .401, 95% CI: .207 to .594) was very moderate (eta squared = .126) (Cohen, 1988). Additionally, with Levene's Test for equality of variance significant ($F = 1.231, p = .270$), a significant difference in PTTs realization competence ($t(117) = 2.409, p = .018$, two tailed) was found in the mean scores of PTTs with high school technical-subject background ($M = 77.25, SD = 4.952, N = 55$) and PTTs without high school technical-subject background ($M = 75.27, SD = 3.976, N = 64$). At an observed power of 66.6%, the magnitude of the differences in the means (mean difference = 1.972, 95% CI: .35 to 3.59) was very small (eta squared = .047) (Cohen, 1988).

5. FINDINGS AND DISCUSSION

This study examined the relationship among the SI, realisation competence, age, and high school background in technical knowledge of PTTs using quantitative data from 119 PTTs at MTCE. Preliminary results of the study showed that the average SI of PTTs was a little above 60%, and their competency in realisation was a little below 80%. In the design and realisation course, the PTTs' level of realisation competency was higher

than their SI's. If realization competency is based on situational interest, as proposed by Hong et al. (2019), it stands to reason that a small amount of interest in an activity will boost the desire to seek out additional opportunities to learn and therefore improve on competence.

The study's results also showed that SI correlated moderately with age but highly with the realisation competence of PTTs, indicating that PTTs' SI increased with age advancement and realisation competence. The finding is similar to PTTs who had high school technical knowledge. The findings support previous results that one, SI and knowledge or competence are positively related (Linnenbrink-Garcia et al., 2013; Otundo & Prince, 2019); Rotgans & Schmidt, 2011; Roure & Lentillon-Kaestner, 2022), and two, age and situational interest are positively correlated (Grund et al., 2019). However, age was not correlated with realisation competence, nor was SI correlated with the folio skills of PTTs without high school technical-subject background. This result aligns with the findings of Kiili et al. (2021) who found that competence-related aspects of game-based learning was not associated with situational interest. A critical analysis of the lack of significant correlation between SI and folio among PTTs without high school technical-subject background points to a particular gap in the realisation competence of PTTs who did not study technical subjects at the high school. Not even was advancement in age able to mitigate the relationship. Critics of the policy for allowing students without high school technical knowledge to pursue a degree course in technical education at the College have reasons to worry. Besides, this finding disagrees with Tobias' (1994) assertion that a stronger linear correlation between SI and background knowledge exists perpetually. Thus, as established by Roure and Lentillon-Kaestner (2022), it is most likely that different students would have different situational interest and competence in skill-related activities. To it, the effect of situational interest manifests differently depending on the individual's level of competency (Woo & Kim, 2022).

Another interesting finding of this study was that whereas SI and age of PTTs affected realisation competence of PTTs, high school technical-subject background was not a significant predictor of the realisation competence of PTTs. Thus, although high school technical-subject background did correlate with realisation competency, PTTs' realisation competence still needed to be determined. This means that the competence of PTTs in realising quality folio and artifact is independent of their high school technical-subject background. Instead, as observed from the results, the SI was the most relevant indicator. This present study vindicates the opinion by Tobias (1994) that SI could trigger personal experience and competence more than the background knowledge possessed by people. Similarly, as opined by Hong et al. (2019), SI can affect PTTs' performance in technically related subjects.

On the question of differences between PTTs with and without high school technical-subject background in their SI and realisation competence, the study showed that PTTs with high school technical-subject background had a stronger sense of SI than PTTs without high school technical-subject background. Additionally, in the realisation contest, PTTs with high school technical-subject backgrounds outperformed their peers without high school technical-subject backgrounds. The combined results prove why technical tutors who teach PTTs complain about admitting non-technical students from high schools into technical programmes at the College level. It may be hard time decision makers to take a second look at the policy of allowing students without high school technical-subject background to pursue technical-related programmes at the College of Education.

6. CONTRIBUTION OF THE STUDY

This study sheds light on the relationships between SI, age, and realisation competency among pre-service technical teachers. It emphasizes the role of SI in predicting realisation competency and shows that a high school technical-subject background may influence these factors. The study also emphasizes the disparity in realisation competence between PTTs with and without high school technical-subject backgrounds and calls into question the policy of admitting non-technical students into technical programmes at the Colleges of Education. The findings can contribute to the understanding of factors that impact the professional development of pre-service technical teachers and inform educational practices such as the selection criteria for pre-service technical teachers into Colleges of Education.

7. IMPLICATIONS OF THE STUDY

This study was delimited to 119 PTTs from a single college in Ghana. The finding cannot be generalised to all colleges of education in Ghana. However, the study's results remain valid and can be applied to policy decisions for colleges with similar characteristics. The weight of the evidence in the regression analysis points to a strong, linear link between the combined effect of SI and high school technical knowledge and realisation competence. While the link between the variables seems modest and may only explain 34.2% of the variance, about 66% of the variance in realisation competence is still unaccounted for, leaving a sizeable amount of independent variance with which SI and high school background knowledge can alter. Therefore, it is recommended that future research examines other factors that can accompany SI to account for higher variance in realisation competence. Given that the quality of instruction can improve students' learning outcomes, future research can include instructional quality in the model to examine its total effect on the realisation competence of PTTs.

The study emphasizes the importance of SI in the realization competence of pre-service technical teachers (PTTs). The findings indicate that SI not only improves PTTs' performance in technically related subjects, but also that PTTs' competence in achieving quality folio and artifacts is independent of their high school technical-subject background. This finding implies that SI can elicit personal experience and competence more than background knowledge alone. As a result, technical educators and curriculum developers should explore introducing SI-promoting practices into technical education programs. These strategies include creating meaningful learning experiences that capture the interest of PTTs.

The study discovered a disparity in the realisation competency and SI levels of PTTs who did not pursue technically related subjects in high school. This observation raises concerns about admitting non-technical students without the essential background knowledge to technical programs at the College. Policymakers should seriously consider allowing students without a technical-subject background in high school to pursue technical-related programs. Consideration should be given to establishing prerequisite requirements or providing remedial courses to bridge the knowledge gap thereby ensuring that students have a solid foundation in technical knowledge before pursuing technical-related programs at the College of Education.

8. CONCLUSION

The study intended to relate PTTs' SI, realisation competence, and age taking into consideration their high school technical-subject background. Based on the study's findings, it can be concluded that, on average, PTT demonstrated a very good level of realisation competence but a moderate SI. Generally, moderate to high levels of correlation was observed between realisation competence, SI, and age. Furthermore, the combined effect of SI, age, and high school background knowledge predicted about 34.2% of the variance in PTT realisation competence. Nonetheless, SI was found to be the primary predictor, followed by age, while high school background knowledge was not a significant predictor. Additionally, PTTs with high school technical knowledge stand a better chance of increasing the SI and improving their realisation competence. In conclusion, it is always the case per the study sample that high SI relates strongly and positively to realisation competence.

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Appendix A

Situational Interest Scale

1. I want to know more about this design and realisation course
2. I will enjoy working on this design and realisation course
3. I think this design and realisation course is interesting
4. I expect to master this design and realisation course well
5. I am fully focused in this design and realisation course; I am not distracted by other things
6. Presently I feel bored this design and realisation course

Folio and Artefact Scoring Rubric (adopted from the Institute of Education)

DESIGN FOLIO			
Steps	Description of Activity	Rating	Scores
1	Situation (i.e. clear statement of problem identification)	6	
2	Brief statement	2	
3	Presentation of Analysis chat	5	
4	Questions based on analysis	6	
5	Design investigation report on at least six (6) areas	12	
6	Stating of specifications	5	
7	Presentation of two (2) possible solutions (sketches and descriptive notes)	18	
8	Development of selected solutions	6	
9	Presentation of final solution in two-point perspective	8	
10	Orthographic projection in 1 st and 3 rd angle scale		
	Front elevation	4	
	Plan	6	
	End view	4	
11	Detail drawing of two parts	6	

12	Preparation of cutting list or part list whichever is applicable	4	
13	Stating of manufacturing processes or sequences	8	
	TOTAL SCORE	100	
PROJECT REALISATION OF ACTIVITY			
Steps	Description of Activity	Rating	Scores
1	Selection of appropriate materials	10	
2	Preparation of work pieces (i.e. parts)	15	
3	Measurement and marking out of work piece	15	
4	Preparation of appropriate joints	20	
5	Application of suitable finishes depending on the type of material	15	
6	Proportionality of product	10	
7	Testing for suitability, function and outlook	15	
	TOTAL SCORES	100	