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Examining the Relationship Among Basic Psychological Needs Satisfaction, Self-Efficacy, and English Achievement of Vocational High School Students in Emergency Remote Teaching

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Abstract
In the context of Emergency Remote Teaching (ERT), this study is conducted to investigate how learning from home impacts Vocational High School students and how their success in English is linked to their well-being, particularly their satisfaction with fundamental psychological needs. To ensure the robustness of the study, questionnaires assessing Basic Psychological Needs Satisfaction, Self-efficacy, and socio-economic factors underwent validation through AMOS software. Notable differences in achievement across eight majors were examined using a one-way ANOVA. The connections among socio-economic factors (such as gender, parental background, and gadget availability), Basic Psychological Needs Satisfaction, Self-efficacy, and students' achievement were delved into through Structural Equation Modeling (SEM). The findings reveal that all student factors, with the exception of Self-efficacy, exerted a significant impact on achievement. It is noteworthy that Self-efficacy exhibited a negative impact, while the presence of gadget availability had the most pronounced positive effect. Interconnections among all these factors were also observed. In summary, the study highlights the influence of various factors, such as socio-economic background and psychological well-being, on the English achievement of Vocational High School students during ERT in Balikpapan, East Kalimantan, Indonesia. The encouragement of students to focus on their well-being, consideration of their family background, and ensuring access to gadgets are deemed critical for achieving better English scores. Future studies can delve deeper using qualitative data and different analysis methods. The inclusion of perspectives from teachers, principals, or parents, coupled with the utilization of standardized English tests, could provide a more comprehensive understanding.

Keywords: Basic Psychological Needs Satisfaction, Self-efficacy, Emergency Remote Teaching, Parental Background, Gadget Availability

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1. INTRODUCTION

Since the COVID-19 outbreak first confirmed in Wuhan City, China, in December 2019, a global disruption ensued. Declared a pandemic by the World Health Organization on March 11, 2020, (World Health Organization, 2020), the crisis prompted widespread actions, including Indonesia's adoption of Keppres Nomor 12 Tahun 2020 (Setneg, 2020). The pandemic led to global cases exceeding 617 million, with over 12 million deaths (World Health Organization, 2021).

To curb the virus's spread, social distancing and reduced human interactions became imperative, resulting in the closure of educational institutions worldwide. UNESCO (2020) reported that, by April 2020, 189 countries had postponed school openings, affecting 89% of learners globally and triggering the adoption of various educational technologies.

In response, Indonesia's Ministry of Education and Culture introduced Ruang Belajar, an Edutech learning management system (LMS) supporting students at different educational levels (Barron Rodriguez et al., 2020). The shift to emergency remote teaching (ERT) became a temporary solution to sustain the learning process during the crisis (Ewing & Cooper, 2021; Hodges et al., 2020; Rahiem, 2020).

While ERT presented opportunities for home-based learning, challenges arose, especially concerning the sudden shift to online education. Students and teachers faced issues such as technological barriers and the psychological impact of transitioning from traditional to online learning (Hassen, 2020; Usher et al., 2021). Studies revealed increased anxiety, depression, and stress among students during ERT (Usher et al., 2021).

Basic psychological needs, critical for mental health and performance (Vallerand et al., 1997; Zhou et al., 2021), became a focal point. Meeting these needs was deemed essential for overall well-being and stress reduction (Behzadnia & Fatah Modares, 2020). The satisfaction of basic psychological needs was also linked to self-efficacy beliefs, playing a motivational role in academic tasks (Macakova & Wood, 2022).

Self-efficacy, considered akin to competence, had varying impacts on different academic contexts (Bandura et al., 1999; Vermeulen et al., 2012, 2015). Notably, self-efficacy was identified as crucial for vocational high school students to develop employability skills (Suharno et al., 2020).

The transition to emergency remote teaching presented challenges for vocational high school students, affecting their academic achievement, self-management, and satisfaction (Sinaga & Pustika, 2021). This study aims to investigate the relationship between socio-

economic variables, basic psychological needs, self-efficacy, and academic achievement among vocational high school students during emergency remote teaching. The study will address the following research questions:

1. Is there a significant correlation between gender, parental background, gadget availability, Basic Psychological Needs Satisfaction, and Self-efficacy?
2. Do gender, parental background, gadget availability, Basic Psychological Needs Satisfaction, and Self-efficacy have an impact on English achievement?

2. METHODOLOGY

A quantitative approach was adopted in this study to explore the relationship between socioeconomic variables (gender, parental background, and gadget availability), basic psychological needs satisfaction, self-efficacy, and academic achievement among 12th grade students in a public vocational high school in Balikpapan, East Kalimantan (Gay et al., 2012; Johnson & Christensen, 2014). This approach was chosen because of its objectivity and reduction of human bias in data interpretation. The research, conducted during the 2021-2022 academic year as part of the Emergency Remote Teaching, used a nonexperimental correlational design (Johnson & Christensen, 2014). The population consisted of 12th grade students from public vocational high schools in Balikpapan, with a sample size of 216 students selected using multistage random sampling. The participants represented various majors such as Business Management, Computer and Networking, and Engineering, and provided insights into their experiences with both conventional and emergency distance learning methods, especially in learning English during the pandemic.

2.1 Instruments

The study employed several instruments to collect data on students' satisfaction with their psychological needs, self-efficacy, and academic achievement. The Basic Psychological Needs Satisfaction Questionnaire, which is based on Deci & Ryan's (2000) theory, was modified into the Basic Psychological Needs Satisfaction Scale at School. This scale includes autonomy, competence, relatedness, and arousal. The General Self-efficacy Questionnaire, sourced from Schwarzer, Bäßler, Kwiatek, Schröder, & Zhang (1997), consists of ten items that measure an individual's self-belief in their ability to succeed. Academic achievement was evaluated based on English scores from the previous semester. The primary data sources were online surveys and English scores from odd semester reports. The research protocol included a preliminary face validity study for the instruments, obtaining institutional approvals, and

conducting online meetings during English class periods to explain the research and request participation. The questionnaires were distributed via Zoom meetings and supervised by English teachers to ensure proper administration.

Table 1. Distribution of Selected Text Types

Basic Psychological Needs	Number of items
Autonomy	7
Competence	6
Relatedness	8
Arousal	7

2.2. Data Analysis Techniques

The datasets were analyzed using Structural Equation Model (SEM) with AMOS software. The analysis included descriptive statistical analysis, one-way analysis of variance (ANOVA), and structural equation modeling (SEM). Goodness-of-fit indices were used to determine the overall fit of the model. In conclusion, two types of questionnaires taken from the BPNS and a self-efficacy questionnaire elaborated with questions about the socio-economic status would be used. The quantitative data will be analyzed using multivariate techniques, including descriptive statistics, inferential statistics, factor analysis, and regression analysis using SEM.

3. FINDINGS

3.1. Data Demography

Participants of the research were 304 Vocational High School students. 52.6% of them were males (n= 160), while the rest were females with 47.4% (n= 144).

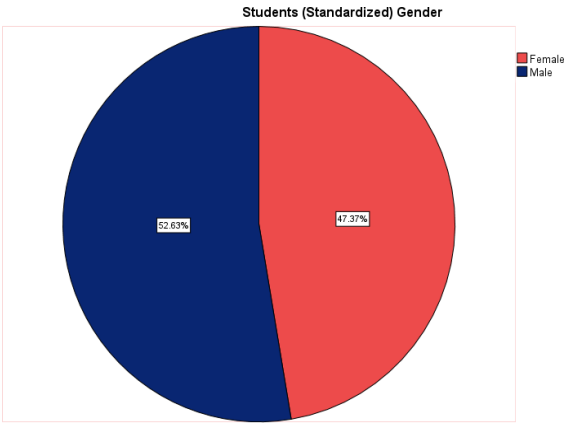

Figure 1 The Participants by Gender

Figures 2 and 3 present the descriptive statistics of parental education for the total number of participants who responded to the related questions. The data shows that 60.2% (n=183) of fathers had a secondary education background, while only 0.3% (n=1) held

postgraduate degrees. Similarly, 47.4% (n=144) of mothers graduated from high school, while only 1% (n=3) had a graduate degree.

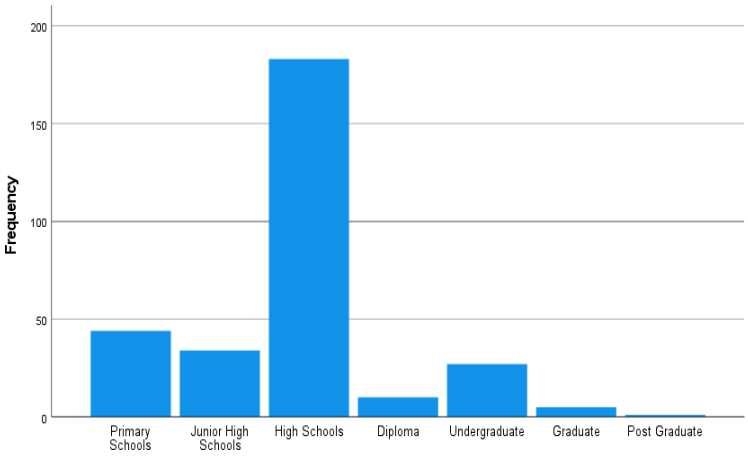

Figure 2 Fathers' Education

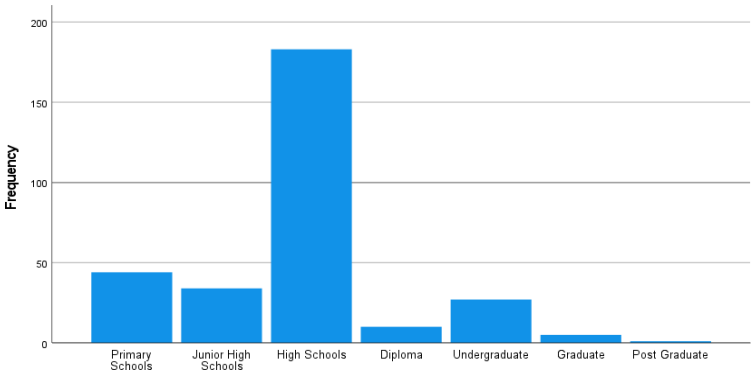

Figure 3 Mothers' Education

Figure 4 displays the income distribution of participants' parents. The majority (40.1%) have an income between Rp 1,000,001 and Rp 3,000,000, while 32.2% fall in the Rp 3,000,001 to Rp 5,000,000 range. Fewer participants have higher incomes, with 5.9% between Rp 5,000,001 and Rp 10,000,000, and only 1.3% earning more than Rp 10,000,001. A small portion (20.4%) reports income below Rp 1,000,000. Cumulatively, 60.5% have incomes up to Rp 3,000,000, and all participants are included in the total.

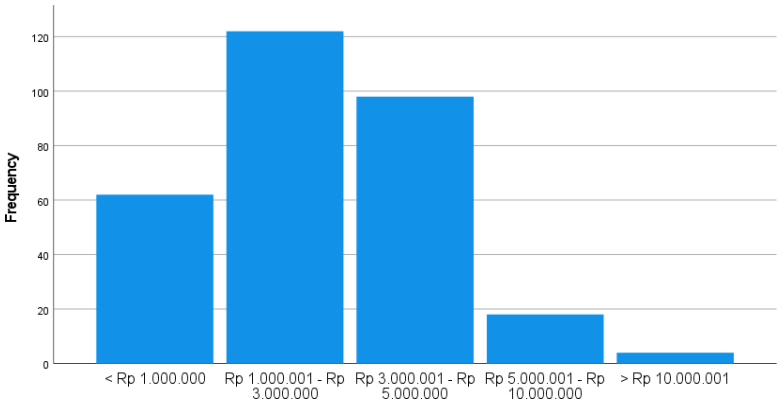

Figure 4 Parents' Income

In the sample of the research presented in Figure 5, N=304 (100%) of participants reported gadget availability at home without any missing values. Of these participants, 9 (3%) owned tablets as a device for supporting learning, while 130 (42.8%) used laptops to study at home.

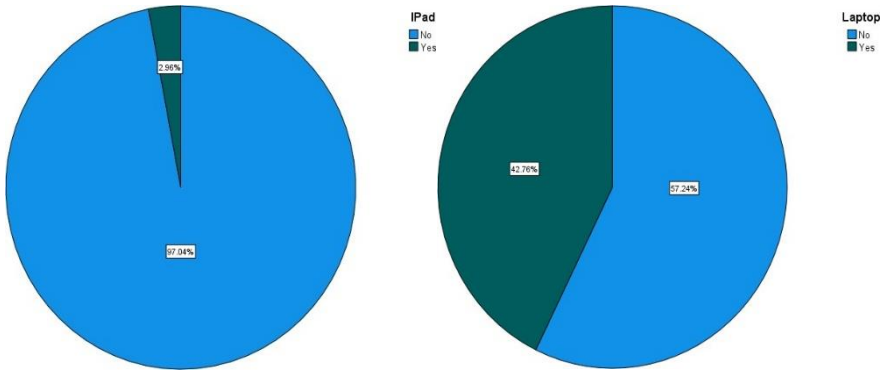

Figure 5 Gadget's Availability

3.2. Basic Psychological Needs Satisfaction

The construct of Basic Psychological Needs Satisfaction consists of 28 items that are categorized into Autonomy, Competence, Relatedness, and Arousal. All 304 responses for these items were valid, resulting in a 100% completion rate with no missing values. The mean values for all items exceeded 1.50, although there was some disagreement among the seven Autonomy items. Specifically, the statement 'There is not much opportunity for me to decide myself how I want to do my schoolwork' received a mean score of 1.57. Furthermore, the items 'I feel a sense of accomplishment in English lessons' and 'I often do not feel very capable in English lessons' received the lowest mean values (M=1.30 and 1.38, respectively) in the Competence category. In the Relatedness and Arousal categories, only one item, 'I pretty much keep everything to myself' (M=1.36), scored lower than the standard value, indicating disagreement with the statement. However, most items in these categories exceeded the standard value of 1.50, with mean scores ranging from 1.60 to 2.34. This suggests that participants were generally satisfied with their Basic Psychological Needs. Additionally, the

distribution shape, skewness, and kurtosis values for the 28 items fell within the range of +/-2 and +/-5, respectively, indicating a normal distribution of data.

Table 2. Descriptive statistics for Basic Psychological Needs Satisfaction

Construct and the items	N	Mean	Std. Deviation	Skewness	Kurtosis
AUTONOMY					
I feel like I can make a lot of inputs to deciding how my English task gets done	304	1.74	.574	-.349	.271
I feel pressured during English online meetings	304	1.87	.759	-.685	.555
I am free to express my ideas during English online sessions	304	1.68	.593	-.238	-.051
I have to do what I am told	304	2.31	.534	-.025	.152
My feelings are taken into consideration by my English teacher	304	1.67	.743	-.299	-.106
I can be my true self when learning English	304	1.79	.682	-.267	.103
There is not much opportunity for me to decide myself how I want to do my schoolwork	304	1.57	.641	.004	-.234
COMPETENCE					
I do not feel very competent when I am assigned an English task	304	1.63	.719	-.228	-.123
My English teachers give me positive feedback on my submitted work online	304	1.96	.693	-.546	.706
I have been able to learn interesting new skills online	304	1.85	.607	-.446	.837
I feel a sense of accomplishment in English lesson	304	1.30	.674	.337	.149
I do not get much of a chance to show how capable I am in English lesson	304	1.71	.621	-.453	.368
I often do not feel very capable in English lesson	304	1.38	.840	.092	-.569
RELATEDNESS					
I can still keep in touch with my friends like when I am at school	304	2.04	.651	-.396	.572
I communicate well with my friends	304	2.22	.592	-.296	.520
I pretty much keep everything to myself	304	1.36	.784	.052	-.430
I consider the people I study together to be my friends	304	1.93	.587	-.578	1.634
English teachers care of me	304	1.95	.673	-.664	1.180
I cannot get close to my friends	304	2.17	.674	-.614	.766
My friends do not have a chance to see any of my good work	304	1.67	.622	-.880	.727
People at school are pretty friendly towards me during online sessions	304	2.10	.577	-.314	1.246
AROUSAL					
I enjoy studying at home	304	1.60	.892	-.132	-.711
I have enough electronic devices to perform online learning	304	1.80	.650	-.142	-.014
I can focus on the online learning tasks whenever I need to	304	2.13	.588	-.229	.644
I do not feel like turning on my computer when it is time for English online learning	304	2.03	.674	-.299	.048
I do not like English online learning	304	1.82	.806	-.420	-.164
I do not have the technical skills to perform online learning tasks	304	2.21	.566	-.224	.845
I enjoy learning on my own	304	2.34	.563	-.121	-.700
Valid N (listwise)	**304**				

3.3. Self-Efficacy

The questionnaire results show that the participants have a predominantly positive perception of their self-efficacy beliefs. The mean scores, ranging from 1.84 to 2.28, reflect a moderate to high level of self-efficacy. This indicates that the participants are confident in their ability to solve problems, achieve goals, and handle unexpected events efficiently. The range of standard deviations (0.481 to 0.734) indicates a moderate level of variability in responses. The acceptable skewness and kurtosis values imply a generally symmetric and normally distributed dataset. It is worth noting that even the lowest mean score of 1.84 for the item 'I am confident that I could deal efficiently with unexpected events' still indicates a favorable perception of self-efficacy among participants.

Table 3. The Results of the Questionnaire on Students' Self-efficacy

Construct's items	N	Mean	Std. Deviation	Skewness	Kurtosis
I can always manage to solve difficult problems if I try hard enough	304	2.28	.550	-.213	.873
If someone opposes me, I can find means and ways to get what I want	304	2.11	.533	.102	.356
It is easy for me to stick to my aims and accomplish my goals	304	2.00	.699	-.234	-.264
I am confident that I could deal efficiently with unexpected events	304	1.84	.734	-.192	-.258
Thanks to my resourcefulness, I know how to handle unforeseen situations	304	2.14	.517	.188	.404
I can solve most problems if I invest the necessity effort	304	2.07	.585	-.109	.309
I can remain calm when facing difficulties because I can rely on my coping abilities	304	1.92	.627	-.182	.197
When I confronted with a problem, I can usually find several solutions	304	2.10	.481	.257	1.096
If I am in a bind, I can usually think of something to do	304	2.06	.551	-.208	1.260
No matter what comes my way, I am usually able to handle it	304	1.98	.645	-.280	.323
Valid N (listwise)	**304**				

3.4. Students' Achievement

The mean score of accounting students (M=88.97, SD=6.742) was significantly higher than that of students majoring in software engineering, electrical installation engineering, vehicle engineering, and mechanical engineering. Additionally, there were significant score variations among students majoring in office administration and banking/microfinance compared to other majors. Figure 5 illustrates the distinctions between accounting and electrical installation engineering, with accounting having the highest scores and electrical installation engineering having the lowest scores. The statistical significance is demonstrated at $p<.001$.

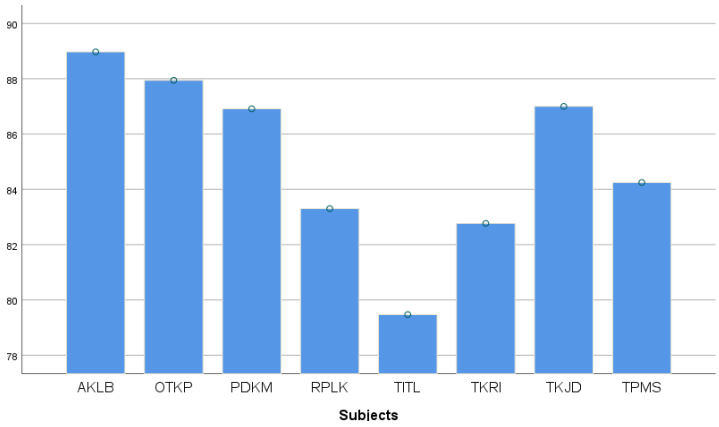

Figure 6 Students' Achievement in English Test

3.5. Confirmatory Factor Analysis Results

3.5.1. The Goodness of Fit Indices of Parental Background

The goodness-of-fit indices, such as the Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI), indicate a satisfactory model fit, surpassing cutoff values with values of .959 and .878, respectively. However, the Root Mean Square Error of Approximation (RMSEA) value slightly surpasses the acceptable threshold at .135. Despite this RMSEA limitation, the overall construct validity remains significant, supported by robust estimate loadings and other favorable goodness-of-fit indices. The validated one-factor model was then used in the subsequent Structural Equation Model analysis.

Table 4. Goodness-of-Fit Indices of Parental Background

Model	CMIN	df	CMIN/df	TLI	CFI	RMSEA
One-factor model	6.500	1	6.500	.878	.959	.135

3.5.2. The Goodness of Fit Indices of Basic Psychological Needs Satisfaction

Table 5 summarizes the analysis of goodness-of-fit indices for the Basic Psychological Needs Satisfaction variable. Four models are compared based on Chi-square value (CMIN), degree of freedom (df), CMIN/df, Tucker-Lewis Index (TLI), Comparative Fit Indices (CFI), and Root Mean Square Error of Approximation (RMSEA). Both the one-factor and N-orthogonal models show subpar fit indices, with CFI, TLI, and RMSEA values all exceeding (.1). However, the N-correlated model shows an improvement in fit indices, with an acceptable RMSEA of .088 and a moderately acceptable CFI of .821. In contrast, the hierarchical model demonstrates satisfactory fit indices across all indicators, with TLI of .812, CFI of .845, and RMSEA of .084 meeting or surpassing acceptable thresholds. In conclusion, based on the estimated loadings and goodness-of-fit indices, the hierarchical model appears to be the best-

fitting model for Basic Psychological Needs Satisfaction, and will be used in subsequent analyses.

Table 5. Goodness-of-Fit Indices of Basic Psychological Needs Satisfaction

Model	CMIN	df	CMIN/df	TLI	CFI	RMSEA
One-factor Model	457.567	90	5.084	.613	.669	.116
N-Orthogonal	574.280	90	6.381	.491	.563	.133
N-Correlated	282.631	84	3.365	.776	.821	.088
Hierarchical	236.533	75	3.154	.812	.845	.084

3.5.3. The Goodness of Fit Indices of Self-Efficacy

Overall, the results of the goodness-of-fit indices demonstrate good construct validity. The TLI and CFI values were both above .90, and the RMSEA value (.078) indicates a good fit. Therefore, it can be concluded that the self-efficacy model meets the requirements for further analysis.

Table 6. Goodness-of-Fit Indices of Students' Self-Efficacy

Model	CMIN	df	CMIN/df	TLI	CFI	RMSEA
One-factor model	99.814	35	2.852	.929	.945	.078

3.6. Structural Equation Modelling (SEM)

The structural equation modeling (SEM) section focused on presenting the hypothesized and final models. The models illustrated the relationships between categorical variables (students' gender, parental background, and gadget availability) and continuous variables (basic psychological needs satisfaction and self-efficacy). The hypothesized model outlined how gender directly influenced various factors, including parental background, gadget availability, Basic Psychological Needs Satisfaction, self-efficacy, and achievement. Parental background, in turn, influenced gadget availability, basic psychological needs satisfaction, self-efficacy, and achievement. Gadget availability influenced Basic Psychological Needs Satisfaction, Self-efficacy, and Achievement. Basic psychological needs satisfaction directly influenced self-efficacy and achievement, and the former directly influenced student achievement. The conceptual model visually depicted these relationships (Figure 7).

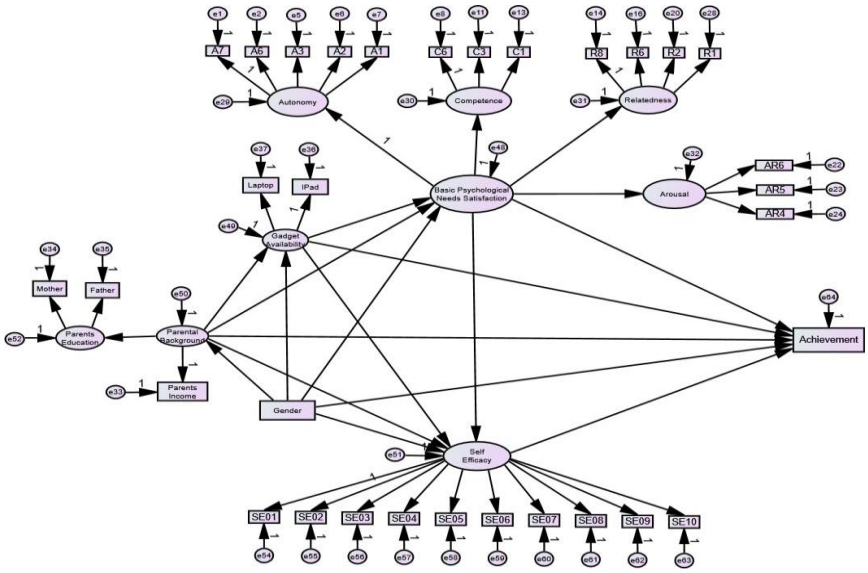

Figure 7 The hypothesized model of structural equation modelling

Figure 8 illustrates the final SEM model of this research, which describes the relationship between latent and observed variables, including gender, parental background, gadget availability, Basic Psychological Needs Satisfaction, and Self-efficacy.

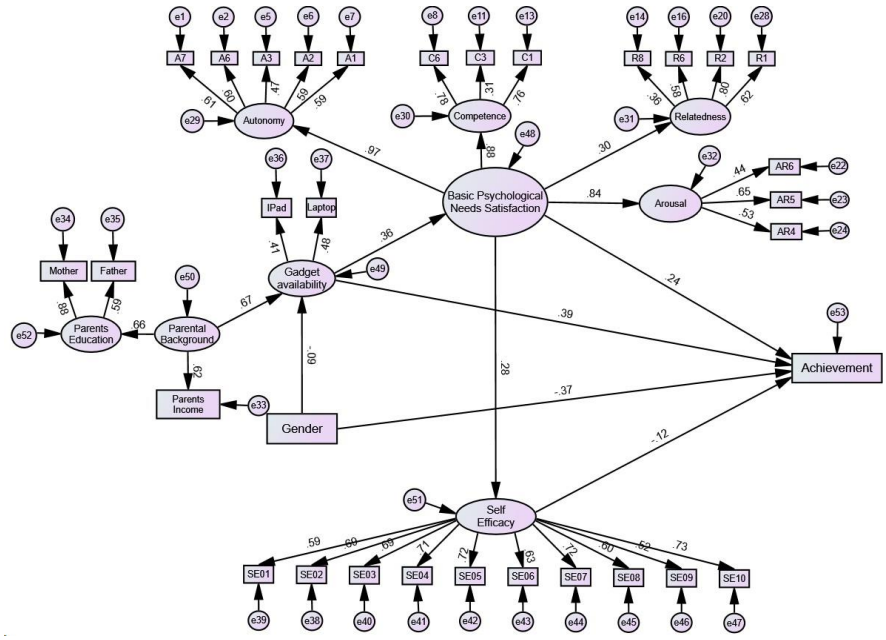

Figure 8 The standardized model of structural equation modelling

Table 7. The table of direct, indirect, and total effects

Variables		**Direct**		**Indirect**		**Total effect**	
Independent	Dependent	Std	Unstd	Std	Unstd	Std	Unstd
Gender	Gadget availability	-.095	-.013	.000	.000	-.095	-.013
	Achievement	-.365	4.533	.043	-.540	-.408	5.073
Parental	Gadget	.668	.083	.000	.000	.668	.083

Variables		Direct		Indirect		Total effect	
background	availability						
Gadget	BPNS	.356	1.956	.000	.000	.356	1.956
availability	Achievement	.385	34.629	.073	6.579	.458	41.208
BPNS	Achievement	.238	3.900	-.033	-.537	.206	3.363

The analysis showed that female students tend to own more gadgets than male students (coefficient γ = -0.09). Additionally, gender had a negative effect on academic achievement (coefficient γ = -0.37), suggesting that, on average, female students outperformed their male peers. The availability of gadgets had a direct impact on BPNS (coefficient γ = 0.36) and academic achievement (coefficient γ = 0.39). The study suggests that students who have access to more learning gadgets tend to be more satisfied with their basic psychological needs and achieve better academic results.

The research found a strong correlation between gadget availability and parental background, with a coefficient of γ = 0.67. This indicates that parents with higher education and income are more likely to purchase gadgets for their children. BPNS had a positive direct effect on both self-efficacy (coefficient γ = 0.28) and academic achievement (coefficient γ = 0.24). This suggests that students who are more satisfied with their basic psychological needs tend to have higher self-efficacy and achieve better academically. However, self-efficacy had a negative impact on academic achievement (coefficient γ = -0.12), indicating that as self-efficacy increases, academic achievement tends to decrease.

The structural equation modeling (SEM) model demonstrated good fit indices (TLI = 0.778, CFI = 0.796, RMSEA = 0.066), indicating that the model effectively represents the relationships among the variables. Table 7 presents the standardized regression weights, which further clarify the direct, indirect, and total effects of various factors on each other. The model suggests that female students generally outperform male students academically, despite the positive indirect effect of gender and achievement. It provides valuable insights into the intricate connections between socio-economic variables, psychological needs, self-efficacy, and academic achievement.

4. DISCUSSION

Structural Equation Model (SEM) analysis revealed complex relationships between gender, parental background, gadget availability, BPNS, and SE. Surprisingly, no gender differences were found in relation to BPNS, contrary to conventional teaching methods (Juuti et al., 2010). However, in the context of Emergency Remote Teaching, female students were identified to have a higher gadget availability (Reychav & McHaney, 2017). This aligns with

the coping strategy of using technology during the pandemic, where females, deemed more mature and ready for learning (Lovat & Darmawan, 2019), adapted by owning more devices.

Parental background strongly influenced gadget availability, with higher parental education and income correlating with increased gadget ownership. This aligns with previous studies emphasizing the impact of socioeconomic status on technology usage (Kormos & Kiddle, 2013; Lee & Lee, 2023). Moreover, gadget availability significantly contributed to BPNS, contrary to concerns raised by (James et al., 2022). The context of Emergency Remote Teaching might differ significantly from online learning, affecting students' psychological needs satisfaction.

The SEM analysis further revealed a positive relationship between BPNS and SE, emphasizing the importance of meeting psychological needs for enhancing self-efficacy (Zhen et al., 2017). The results also indicated that socioeconomic variables (gender and gadget availability), BPNS, and SE had direct and indirect relationships with students' achievement. Female students demonstrated higher achievement, consistent with findings by (As Sabiq et al., 2021), highlighting gender differences in motivation and attitudes. Similarly, gadget availability positively correlated with achievement, echoing research on the positive impact of technology on student performance (Darko-Adjei, 2019; Gatens, 2017).

Higher BPNS was associated with better academic achievement, contradicting concerns about technology negatively affecting psychological needs (James et al., 2022). This supports the idea that fulfilling basic psychological needs is crucial for academic success, as suggested by Maslow (2013) and self-determination theory (Deci & Ryan, 2000). It is suggested that humans must fulfill their basic needs before they can achieve other needs. Education is considered a need that can be pursued after the satisfaction of basic psychological needs.

Previous studies on self-efficacy have shown that it is a strong predictor of achievement. Furthermore, self-efficacy is often indicative of achievement (Adeyemo, 2007; Asriati et al., 2018; Caprara et al., 2011). According to Byrne et al. (2014), self-efficacy is considered an individual's level of accomplishment. However, this contradicts the negative and significant impact on achievement found in this study. Students' achievement is directly affected (γ=-.12) by self-efficacy, meaning that those with lower self-efficacy tend to have higher academic achievement. Conversely, those with higher self-efficacy may experience lower achievement, at least in the context of English.

5. CONCLUSION

In summary, this research explores the intricate dynamics between socioeconomic variables, Basic Psychological Needs Satisfaction (BPNS), Self-efficacy (SE), and academic achievement. The Structural Equation Model (SEM) analysis reveals significant findings. Gender and gadget availability emerge as influential factors affecting students' achievement, with female students exhibiting superior academic performance. Gadget availability not only directly impacts achievement but also influences BPNS. Interestingly, BPNS positively correlates with both SE and achievement, underscoring the role of fulfilling basic needs in overall success. However, the unexpected negative direct effect of SE on achievement raises intriguing questions. Despite its valuable insights, the study has limitations. The reliance on quantitative methods and final examination English scores could be enhanced by incorporating qualitative data and standardized English tests for a more representative measure of achievement. The research suggests avenues for future exploration, advocating for a more comprehensive approach that integrates multilevel analysis (HLM) and includes diverse perspectives from teachers, principals, and parents. This approach aims to offer a holistic understanding of the complex dynamics influencing students' outcomes.

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