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ENHANCING ENGINEERING STUDENTS' SELF-DIRECTED LEARNING OF COMMUNICATION SKILLS: IS IT TEACHER SUPPORT AND/OR PEER SUPPORT?

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ABSTRACT

Research shows that perceived teacher and peer support are essential to self-directed learning. Previous research has also examined the function of self-directed learning of Communication skills among Engineering undergraduates. Yet, there is a paucity of research into the influence of perceived teacher support and peer support in facilitating self-directed learning for the effective development of Communication skills. Thus, this study evaluated the effects of perceived teacher support and peer support on self-directed learning of Communication skills among Engineering students at technical universities in Ghana. This is a quantitative study with a cross-sectional survey design. A simple random sampling technique was employed to choose six technical universities, while a stratified random sampling technique was used to draw the sample sizes from each institution. Data were gathered from 1,189 first-year Engineering students. Multiple regression was used in analysing the data. The results revealed positive effects of teacher support and peer support on self-directed learning. Notwithstanding, the effect of teacher support was much stronger, indicating that teacher support best determines self-directed learning. Thus, it is imperative for teachers to discern the specific teacher activities that elicit favourable perceptions from students, in order to actively improve and refine these activities.

Keywords: Communication Skills, Peer Support, Self-Directed Learning, Teacher Support, Technical Universities

INTRODUCTION

English is the official language used for instruction at Ghanaian universities. It is utilised throughout many activities, encompassing administrative tasks, delivering lectures, creating assignments, executing research projects, and conducting formal presentations within lecture rooms. Given the prevalence of English as the language utilised in the domains of science and technology, there is an escalating recognition of its significance and necessity, particularly in the context of technical and professional degree programs such as Engineering (Riaz & Riaz, 2023). Not only are Engineering students anticipated to possess a high level of

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English proficiency, but they are also encouraged to enhance their overall Communication skills.

In addition, it is imperative for the students to possess a proficient grasp of technical English, as they are required to compose various forms of written communication such as technical descriptions and instructions, proposals, letters and memorandums. The acquisition of English language skills is undeniably necessary for the students in order to proficiently deliver presentations, compose coherent paragraphs tailored to specific objectives, and effectively communicate orally or in writing across diverse settings (Riaz, 2021).

In the contemporary labour market, both in Ghana and outside Ghana, there has been a notable increase in competitiveness. Consequently, in order to achieve success, students pursuing a career in Engineering must possess distinctive attributes that set them apart from their peers who possess comparable qualifications. To be relevant in the global milieu, Engineering graduates must possess effective communication skills. Numerous studies conducted on Communication skills have revealed that those who possess inadequate or bad Communication skills experience a notable detrimental impact on both their personal and professional lives (Konar, 2021; Sumaiya et al., 2022). Hence, it is crucial to cultivate Communication skills within the realm of engineering education, as it enables students to learn the necessary abilities essential for their professional development. Consequently, the course should be an integral component of any higher education programme in Engineering (Kovac & Sirkovic, 2017).

To emphasise on how Engineering students could develop effective Communication skills, a number of researchers have examined the role of self-directed learning (SDL) of Communication skills (Awang & Daud, 2015; Barhoumi, 2023; Knobbs & Grayson, 2012; Yulianti et al., 2021). Yulianti et al. (2021), for instance, examined the undergraduates' perspectives on the application of self-directed learning in improving speaking skills and reported that self-directed learning is a very efficacious approach employed beyond the confines of traditional classroom settings, facilitating learners in enhancing their oral communication abilities. Moreover, Barhoumi (2023) analysed self-directed learning approaches in enhancing soft skills of students, including Communication skills and revealed that self-directed learning approaches such as team work, group discussion and flipped class improves Communication skills. It is worth mentioning that self-directed learning is sometimes used interchangeably with self-regulated learning or autonomous learning (Brandt, 2020; Lamkhanter, 2022). Therefore, the content utilised in this study is derived from these three contexts in order to accommodate self-directed learning.

A considerable amount of literature is devoted to delineating what self-directed learning is. Knowles (1975) explained self-directed learning as a learning method characterised by individuals taking the initiative, either independently or with assistance from others, to identify their learning needs, establish learning objectives, identify the necessary resources for learning, select and implement suitable learning strategies, and

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assess the outcomes of their learning. In essence, individuals assume responsibility for and exercise control over their own learning process. Geng et al. (2019) described self-directed learning as the cognitive mechanisms employed by individuals to intentionally guide their own acquisition of knowledge and proficiency in problem-solving. According to these authors, self-directed learners tend to engage in learning activities with greater involvement, such as reading online educational resources, doing classroom assignments, and strategically planning and assessing their learning progress. Chen et al. (2023) characterises self-directed learning as a cognitive process wherein the learner assumes an active role in various aspects of the learning experience. These include setting goals, developing plans, engaging in information processing, acquiring new knowledge, monitoring and regulating one's own progress, incorporating feedback for self-correction, optimising the learning environment to enhance effectiveness, and flexibly selecting and adapting learning strategies.

After a thorough examination and establishment of the concept of self-directed learning, an extensive number of studies have been undertaken to evaluate various factors that can boost self-directed learning (Abrouq, 2022). One of such factors is perceived teacher support. Perceived teacher support is the degree to which students perceive that their teachers place importance on their learning and actively strive to cultivate personal connections with them (Chong et al., 2018). Numerous studies have been conducted on the role of perceived teacher support in enhancing self-directed learning within an English learning context (Pan & Chen, 2021; Samad et al., 2019; Shaalan, 2019; Tran & Vuong, 2023). As an instance, Schweder and Raufelder (2019) examined the role of perceived teacher support in self-directed learning and reported the significant role of perceived teacher support in carrying out self-directed learning in schools. Moreover, Pan and Chen (2021) investigated the impact of perceived teacher support on university students' self-directed language learning outside of the classroom in China and reported that the teacher support enhanced self-directed language learning. The study posited that facilitating the enhancement of students' self-directed language learning may be most viable through the promotion of advantageous harmonic engagement with the assistance of teachers.

Another factor that has been shown to foster self-directed learning is perceived peer support. Perceived peer support is a pedagogical approach that involves collaborative learning. It encompasses a wide range of specialised responsibilities that students may assume in order to enhance the learning experiences of others. These roles encompass many responsibilities such as peer support, facilitation, advising, teaching, and leadership, among others (Manning, 2014). Perceived peer support has been found to be a significant factor in motivating students to engage in self-directed learning. Besides, an avenue through which friends might exert impact on self-directed learning is via engaging in collaborative learning. When students collaborate in group or pair settings, they have the opportunity to exchange information and resources, as well as participate in problem-solving tasks that necessitate the use of self-directed learning approaches. Collaborative learning has the potential to cultivate a sense of accountability towards the learning process and facilitate the acquisition

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of essential skills and self-assurance necessary for engaging in self-directed learning (Sukkamart et al., 2023).

Several studies (Huang & Tseng, 2021; Munasinghe et al., 2019; Murniati et al., 2023; Sukkamart et al., 2023) have been conducted on the role of perceived peer support in promoting self-directed learning. For example, Munasinghe et al. (2019) examined the role of external factors in promoting self-directed learning among 30 undergraduates pursuing management related degree programs in Sri Lankan state universities. The findings of their study indicated that friends' and others' support, as an external factor, positively influenced self-directed learning. Huang and Tseng (2021) investigated the link between social support and self-directed learning among 482 undergraduate students from a University in Guangdong Province, China and reported that peer support, which was a form of social support considered in their study, has a significant positive effect on self-directed learning. The findings indicated that increased peer support had a positive impact on students' ability to enhance their self-assessment, self-planning and resource-seeking skills in the process of identifying their learning needs, formulating learning plans, and selecting appropriate learning strategies. Overall, the study emphasized the significant role of peer support on how students are motivated to learn with confidence in their learning goals and, in turn, build their own self-directed learning capabilities.

Moreover, Sukkamart et al. (2023) examined the impact of various forms of support, including family support, teacher support, friend support, fellow students, and university support, on self-directed learning among a sample of 468 undergraduate students enrolled in the Industrial Engineering programme at the School of Industrial Education and Technology at the King Mongkut's Institute of Technology Ladkrabang (KMITL) in Bangkok, Thailand, during the academic year 2021. The results revealed that all the types of support positively influenced self-directed learning. However, fellow student support was ranked the strongest predictor of self-directed learning.

Overall, extant literature has established that perceived teacher support and perceived peer support are essential in self-directed learning. However, to our knowledge, there is no study investigating the concurrent connection of perceived teacher support and perceived peer support with self-directed learning. In furtherance to this, the existing body of research on these factors has predominantly focused on the domain of English as a Foreign Language (EFL) (Huang et al., 2019; Sukkamart et al., 2023), hence creating a dearth of studies within the particular domain of English as a second language (ESL), as is exemplified by the case of Ghana. In addition, scholarly investigations have substantiated the role of self-directed learning in facilitating the development of effective Communication skills among undergraduates pursuing engineering degrees (Yulianti et al., 2021). Yet, there is a lack of studies regarding the importance of perceived teacher and peer support in facilitating self-directed learning of Communication Skills within the specific context of a Ghanaian university's engineering programme. Therefore, this study aims to evaluate the effects of

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perceived teacher support and perceived peer support on self-directed learning of Communication Skills among Engineering students at technical universities in Ghana.

This study will contribute to empirical knowledge on perceived teacher and peer support as the concurrent antecedents of self-directed learning of Communication Skills among undergraduates pursuing various Engineering programmes within the Ghanaian context. By conducting this study, we aim to enhance the existing body of scholarly work that highlights the importance of perceived teacher support and peer support in promoting self-directed learning, most of which are conducted in an EFL setting. Different from those studies, the present study builds this understanding . within an ESL context. This support is critical for engineering students in a university environment as it aids in the development of effective Communication skills.

MATERIALS AND METHODS

Approach, Participants and Sampling

The researchers employed a quantitative approach with a survey design. The target population was 2021/2022 first year Engineering students from the ten technical universities in Ghana. The researchers utilised a two-stage sampling technique to select the sample sizes from the pool of technical universities. In the initial stage, a simple random sampling technique was employed to choose six technical universities with about 9869 first-year Engineering undergraduates. However, 8035 were available to participate in the study.

The second stage encompassed a stratified random sampling technique to draw the sample sizes from each institution. This guaranteed a comprehensive portrayal of the target population and to mitigate any potential sampling bias. Thus, the six strata were University A = 2,581, University B = 1,510, University C = 1,085, University D = 958, University E = 778, University F = 1,123. To determine the sample size for each stratum, the researchers initially computed the sample size relative to the total population of 8035. Using the recommended sample size of a known population with a 99% confidence interval and a margin of error of 0.03% proposed by Johnson and Gill (Johnson & Gill, 2010; Taherdoost, 2016), the researchers used a sample size of 1,550. The researchers then applied the proportionate allocation formula (Stehman & Xing, 2022): nh = n× Nh/N, where nh = stratum sample size, n = overall sample size for the six universities, Nh = stratum population size, and N = overall population size of the six universities, to calculate the sample sizes of each stratum. Table 1 presents the breakdown of the sample frame and size of each stratum.

Table 1. Sample Frames and Sample Sizes for Each Stratum

No	University	Sample frame	Sample size
1	University A	2,581	498
2	University B	1,510	291
3	University C	1,085	209
4	University D	958	185
5	University E	778	150

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6	University F	1,123	217
	Total	8,035	1,550

Data Collection, Instrumentation and Ethical Issues

The Engineering undergraduates that constituted the sample frame at each university were assigned distinct numerical identifiers, which were then randomly chosen to determine the sample sizes within each university. The data gathering process employed the use of Google Forms, a web-based survey application that guarantees participant anonymity, in order to construct an online structured questionnaire.

The questionnaire items were closed-ended to eliminate the possibility of response biases. The questionnaire comprised four distinct sections. The initial section focused on the sociodemographic attributes, including gender, age and Engineering programme of the participants. The subsequent section examined perceived teacher support, while the third explored perceived peer support. The final section examined self-directed learning. Ghaith's (2002) 38-item Classroom life Measure scale was used to assess perceived teacher and peer support. For the purpose of the topic under study, items 1 to 8 were used to measure perceived teacher support while items 9 to 17 were used to measure perceived peer support. Fisher et al.'s (2001) 40-item SDLR scale was used to evaluate self-directed learning. The scales utilised in this study were modified to align with the specific requirements of the research. Each scale included a 5-point Likert scale, with responses ranging from 1 = Strongly agree" to 5 = Strongly disagree."

Apart from the questions on the questionnaire, the questionnaire also involved an introduction outlining the details of the study and the protection of human subjects. The participants were provided with a guarantee of both anonymity and confidentiality about the data, which is solely intended for research purposes. The participants were prohibited from revealing their identities or providing other personal details that could potentially establish a connection to the survey. Furthermore, the participants were granted the privilege to discontinue their involvement in the study at any given moment without incurring any negative consequences. Besides, it was explained to the participants that by completing and submitting the questionnaire, they were providing informed consent to participate in the study.

Data Analysis

The researchers employed SPSS to perform the data analysis. Multiple regression analysis was used to determine whether teacher support and peer support predicted self-directed learning of Communication Skills among university Engineering students in Ghana.

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RESULTS

Participants' Characteristics

Sociodemographic characteristics as applied in the current study encompassed gender: Male = 1 and Female 2, age: Below 18 =1 to Above 27 = 4, and program of study: Civil = 1 to Mechanical = 3. These variables were used to characterise the sample. Thus, they were not integrated into the results. A total of 1550 students were approached to complete the questionnaire, but 1,189 (76.71%) students participated in the survey. The implementation of obligatory answer functionality in Google Forms effectively mitigated the issue of receiving incomplete questionnaires. Table 2 demonstrates the results of the participants' characteristics.

Table 2. Participants' Characteristics

Variables	Characteristics	Frequency	Percent (%)
Gender	Male	1131	95.28
	Female	56	4.72
	Total	1,189	100.00
Age	Below 18 years	51	4.30
	18-22 years	788	66.38
	23-26 year	261	21.99
	27 and above	87	7.33
	Total	1,189	100.00
Engineering Program of study	Civil Engineering	212	17.86
	Electrical Engineering	291	24.52
	Mechanical Engineering	684	57.62
	Total	1,189	100.00

The findings in Table 2 indicate that a majority of the participants were males. This observation provides evidence that the gender composition of technical university education in Ghana is predominantly males (Christel, 2020). Additionally, it was disclosed that a significant proportion of the participants were within the age range of 18 to 22. From the perspective of the Engineering programme, the results indicated that a notable percentage of the respondents were actively engaged in the pursuit of Mechanical Engineering.

Descriptive Statistics of Constructs Items

Generally, descriptive statistics are employed to organize and summarize the data collected from the sample. In the current study, the descriptive statistics consist of the mean values, standard deviation values, the frequencies and percentages of the constructs' items of the independent variable: teacher support and peer support and the dependent variable: self-learning. Table 3 presents the results of the descriptive statistics.

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Table 3. Descriptive Statistics of Construct Items

Item Label	Items	Mean	Std. Dev.	Min.	Max.	Freq	Perc.
	Teacher Support						
TS1	My teacher cares about how much I learn.	4.808	.613	1	5	218	18.33
TS2	My teacher likes to see my work.	4.573	.617	1	5	179	15.06
TS3	My teacher likes to help me learn.	4.785	.626	1	5	54	4.54
TS4	My teacher wants me to do my best in school work.	4.589	.567	1	5	94	7.91
TS5	My teacher thinks it is important to be my friend.	4.404	.538	1	5	187	15.73
TS6	My teacher likes me as much as he/she likes other students	4.657	.678	1	5	198	16.65
TS7	My teacher cares about my feelings	4.381	.486	1	5	98	8.24
TS8	My teach really cares about me.	4.626	.514	1	5	161	13.54
	Peer Support						
PS1	Other students in this class want me to do my best schools work.	4.692	.569	1	5	216	18.17
PS2	In this class, other students like to help me learn.	4.398	.214	1	5	179	15.06
PS3	In this class, other students care about how much I learn.	4.663	.774	1	5	51	4.29
PS4	Other students in this class want me to come to class every day.	4.789	.845	1	5	64	5.38
PS5	Other students in this class think that it is important to be my friend.	4.617	.713	1	5	162	13.62
PS6	In this class, other students like me the way I am.	4.331	.455	1	5	179	15.06
PS7	In this class, other students really care about me.	4.777	.513	1	5	79	6.64
PS8	Other students in this class like me as much as they like others.	4.125	.457	1	5	161	13.54
PS9	Other students in this class care about my feelings.	4.691	.476	1	5	98	8.24
	Self-Directed Learning						
Awareness							
AW1	I identify my own English learning needs.	4.504	.636	1	5	98	8.24
AW2	I am able to select the best method for my own English	4.424	.567	1	5	198	16.65

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	Learning.						
AW3	I consider my English teachers as facilitators of learning rather than providing information only.	4.657	.474	1	5	97	8.16
AW4	I keep up to date on different English learning resources Available.	4.194	.395	1	5	86	7.23
AW5	I am responsible for my own English learning.	4.773	.418	1	5	79	6.64
AW6	I am responsible for identifying my areas of deficit in English learning.	4.187	.735	1	5	51	4.29
AW7	I am able to maintain self-motivation in my English learning.	4.341	.474	1	5	98	8.24
AW8	I am able to plan and set my English learning goals.	4.701	.698	1	5	95	7.99
AW9	I have a break during long periods of learning.	4.543	.498	1	5	97	8.16
AW10	I need to keep my English learning routine separate from my other commitments.	4.651	.477	1	5	63	5.31
AW11	I relate my experience with new information	4.652	.476	1	5	149	12.53
AW12	I feel that I am learning English despite not being instructed by a lecturer.	4.513	.498	1	5	78	6.56
Learning Strategies							
LS1	I participate in group discussions for English learning.	4.729	.414	1	5	79	6.64
LS2	I find peer coaching effective for English learning.	4.652	.476	1	5	97	8.16
LS3	I find 'role play' is a useful method for complex Learning of English.	4.69	.462	1	5	51	4.29
LS4	I find inter-active English teaching-learning sessions more effective than just listening to lectures.	4.574	.691	1	5	198	16.65
LS5	I find simulation in English teaching-learning useful.	4.698	.462	1	5	98	8.24
LS6	I find English learning from case studies useful.	4.574	.691	1	5	63	5.31
LS7	My inner drive directs me towards further	4.642	.724	1	5	86	7.23

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	development and improvement in my English learning.						
LS8	I regard problems as challenges.	4.547	.624	1	5	97	8.16
LS9	I arrange my self-learning routine for English learning in such a way that it helps develop a permanent learning culture in my life.	4.547	.624	1	5	98	8.24
LS10	I find concept mapping is an effective method of English learning.	4.508	.685	1	5	78	6.56
LS11	I find modern educational interactive technology enhances my English learning process.	4.508	.689	1	5	95	7.99
LS12	I am able to decide my own English learning strategy.	4.584	.859	1	5	149	12.53
Learning Activities							
LA1	I rehearse and revise new English lessons.	4.534	.499	1	5	98	8.24
LA2	I identify the important points when reading a chapter or an article	4.463	.694	1	5	86	7.23
LA3	I use concept mapping/outlining as a useful method of comprehending a wide range of information for English learning.	4.503	.695	1	5	78	6.56
LA4	I am able to use information technology effectively in English learning.	4.503	.695	1	5	98	8.24
LA5	My concentration intensifies and I become more attentive when I read a complex study content for my English lesson.	4.503	.695	1	5	95	7.99
LA6	I keep annotated notes or a summary of all my ideas, reflections and new learning when studying English.	4.542	.694	1	5	198	16.65
LA7	I enjoy exploring information beyond the prescribed English course objectives.	4.508	.613	1	5	149	12.53
LA8	I am able to relate knowledge with practice in learning English.	4.573	.617	1	5	51	4.29
LA9	I raise relevant question(s) in English teaching-learning sessions.	4.424	.691	1	5	97	8.16

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LA10	I am able to analyze and critically reflect on new ideas, information or any learning experiences in my English learning process.	4.573	.691	1	5	79	6.64
LA11	I keep an open mind to others' point of view in my English learning.	4.571	.691	1	5	97	8.16
LA12	I prefer to take any break in between any English learning task.	4.501	.653	1	5	63	5.31
Evaluation							
EV1	I self-assess before I get feedback from my English teachers.	4.657	.678	1	5	63	5.31
EV2	I identify the English language learning areas for further development in whatever I have accomplished.	4.381	.486	1	5	149	12.53
EV3	I am able to monitor my English learning progress.	4.424	.493	1	5	79	6.64
EV4	I am able to identify my English language learning areas of strength and weakness.	4.348	.474	1	5	95	7.99
EV5	I appreciate when my work can be reviewed by my peers.	4.342	.474	1	5	51	4.29
EV6	I find both success and failure inspire me to further learn English.	4.342	.474	1	5	78	6.56
EV7	I value criticism as the basis of bringing improvement to my English language learning.	4.504	.468	1	5	97	8.16
EV8	I monitor whether I have accomplished my English learning goals.	4.304	.402	1	5	98	8.24
EV9	I check my achievement in assignments, course works and examinations to review my progress.	4.265	.441	1	5	98	8.24
EV10	I review and reflect on my English learning activities.	4.265	.476	1	5	86	7.23
EV11	I find new ideas in my English learning challenging.	4.265	.441	1	5	97	8.16
EV12	I am inspired to learn English by others' success.	4.304	.461	1	5	198	16.65
Interpersonal Skills							
INS1	I intend to learn more about other cultures and languages I am frequently exposed to.	4.342	.474	1	5	149	12.53

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INS2	I am able to identify my role within a group.	4.304	.538	1	5	79	6.64
INS3	My interaction with others helps me to develop the insight to plan for further English learning.	4.624	.614	1	5	51	4.29
INS4	I make use of any opportunities I come across.	4.657	.551	1	5	97	8.16
INS5	I need to share information acquired from English learning with others.	4.624	.614	1	5	95	7.99
INS6	I maintain good inter-personal relationships with others.	4.624	.614	1	5	198	16.65
INS7	I find it easy to learn English in collaboration with others.	4.648	.617	1	5	78	6.56
INS8	I am successful in communicating verbally.	4.548	.624	1	5	63	5.31
INS9	I identify the need for inter-disciplinary links for maintaining social harmony.	4.548	.624	1	5	98	8.24
INS10	I am able to express my ideas effectively in writing.	4.585	.626	1	5	97	8.16
INS11	I am able to express my views freely in English.	4.589	.567	1	5	86	7.23
INS12	I find it challenging to pursue English learning in a culturally different environment.	4.589	.501	1	5	98	8.24

As presented in Table 3, the mean values of teacher support ranged from 4.381 (.486) to 4.808 (.613), indicating that the learners strongly agreed to the notion of receiving assistance from their teachers during the process of learning English. The results further showed that of the teacher support received, the majority of these learners strongly perceived that their English teachers care about how much they learn.

Again, as presented in Table 3, the mean values of peer support ranged from 4.125 (.457) to 4.789 (.845), indicating that the learners mainly strongly agreed that to the idea of gaining support from their peers while studying English. The results additionally indicated that a significant number of learners strongly perceived that their peers have a great desire for them to excel in their academic endeavours.

As presented in Table 3, the dependent variable, self-directed learning, was measured in terms of the learners' awareness of self-directed learning, their learning strategies that enable them to self-learn, learning activities that enable them to self-learn, evaluation of their self-learning and the interpersonal skills which enable them to self-learn. From Table 3, the

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mean values of the awareness of self-directed learning ranged from 4.187 (.735) to 4.773 (.418), indicating that the learners strongly agreed to being aware of self-learning for English language. Moreover, the results revealed that the majority of the learners were able to select the best method for their own English learning. The mean values of learning strategies for self-learning fell within the ranges of 4.508 (.685) to 4.729 (.414), indicating high agreement of using learning strategies for self-learning among the respondents. Besides, the results showed that in using the learning strategies, the majority mostly preferred to participate in group discussions for English learning. In addition, the mean values of the learning activities adopted for self-learning ranged from 4.381 (.486) to 4.573 (.691), indicating that the participants agreed to using learning activities for self-directed learning. Apparently, the majority of the participants enjoy exploring information beyond the prescribed English course objectives. Furthermore, Table 3 displays the mean ratings derived from the learners for the evaluation of their self-learning, with values ranging from 4.265 (.441) to 4.657 (.678). This indicates the participants agreement of evaluating their self-learning of the English. Possibly, in evaluating their self-learning, the majority of the English learners self-assess before they get feedback from their English teachers. The mean values for the use of interpersonal skills for self-learning of English showed a range from 4.304 (.538) to 4.657 (.551). This indicates the participants agreement to adopting interpersonal skills for self-learning. Moreover, the results revealed that the most of the English learners maintain good interpersonal relationship with others when it comes to using self-learning as a strategy for learning English.

Effect of Perceived Teacher support and Perceived Peer support on Self-directed learning

The results of the multiple regression analysis of the effects of teacher support and peer support on self-directed learning is presented in Table 4.

Table 4. Regression results

Model and Predictor Variable	B	SE B	β	F (3,041)	R	R Square	Adjusted R square
Model 1				33.106***	.737	.643	0.641
(Constant)	76.550	17.129					
Perceived Teacher support	.808	.029	.688**				
Perceived Peer support	.208	.084	.072***				

*Independent/ Predictor variables: Perceived teacher support and Perceived peer support. Dependent variable: Self-directed learning. Effect is significant at *** p < 0.001, ** p < 0.01, * p < 0.05. *** represents a significant level of 0.001; ** represents a significant level of 0.01; * represents a significant level of 0.05*

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The objective of the study was to evaluate the effects of perceived teacher support and perceived peer support on self-directed learning, and the findings of the multiple regression analysis are reported in two parts: the model summary and the regression coefficients. The model summary does not provide a resolution to the research objective. It presents outcomes that illustrate the extent to which the data is aptly suited to address the research objective. Therefore, it provides a concise overview of the correlation that exists between the dependent variable (self-directed learning) and the independent variables (perceived peer support and perceived teacher support). In Table 4, the result of the r-square value and the F-statistic are also provided. The model yielded a positive correlation coefficient of R = .737 for perceived teacher support, perceived peer support and self-directed learning, exceeding the recommended threshold of .60 for a strong correlation (Beniche, 2023; Obilor & Amadi, 2018). This finding suggests that there is a high possibility for students to engage in self-directed learning if they perceive positive teacher and peer support. In addition, the model summary, which includes both predictors, yielded an R^2 value of .643, implying that 64.3% of the variation in self-directed learning is explained by perceived teacher support and peer support. The F statistic, with degrees of freedom (3,041), was found to be 33.106; $p < 0.001$, indicating a significant relationship.

The second part of the multiple regression analysis presents the results of the regression coefficients which provide a resolution to the research objective. In relation to the effect of perceived teacher support on self-directed learning, the results presented in Table 4 indicate that the standardized coefficient of the effect of perceived teacher support on self-directed learning is $\beta = .688$, with a statistically significant level of $p < 0.001$. The finding revealed that a percentage change in perceived teacher support will lead to a corresponding improvement of .688 in self-directed learning. Overall, this indicates that perceived teacher support enhances self-directed learning. In relation to the effect of perceived peer support on self-directed learning, the results presented in Table 4 indicate that perceived peer support positively influences self-directed learning with a standardized beta value of .072, and significant level of $p < 0.001$. The finding revealed that a unit increase in perceived peer support, will lead to an increase of .072 in self-directed learning. All in all, the results suggest that self-directed learning is improved by perceived peer support.

DISCUSSION

The study sought to evaluate the effects of perceived teacher support and perceived peer support on self-directed learning. The findings confirmed positive effects of perceived teacher support and peer support on self-directed learning. This implies that perceived teacher support and peer support play a vital role in self-directed learning. These results are not farfetched as previous studies have ascertained positive effects of teacher support on self-directed learning (Pan & Chen, 2021; Samad et al., 2019; Shaalan, 2019; Tran & Vuong,

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2023) and peer support on self-directed learning (Huang & Tseng, 2021; Munasinghe et al., 2019; Murniati et al., 2023; Sukkamart et al., 2023).

In the present study, a probable explanation for the positive effect of perceived teacher support on self-directed learning is due to the fact that the students perceived their teachers as demonstrating concern and providing aid in their learning. The students additionally regarded their teachers as providing feedback on their work, encouraging them to excel in learning Communication skills, and fostering a friendly relationship with them. Moreover, students have a perception that their teachers hold an equal level of liking towards them as they do towards their peers, and demonstrate a genuine concern for their emotional well-being. Apparently, when students perceive positive attributes in their teachers, it motivates them to assume responsibility and autonomy in their learning, seeking assistance from the teacher only when necessary. The support provided by their teachers fosters self-belief and promotes independent learning, reducing reliance on teacher guidance. This, in turn, enhances self-directed learning.

In addition, a possible explanation for the effect of perceived peer support on self-directed learning could be attributed to the fact that the students held the perception that their peers want to see their optimal performance in various academic tasks, including assignments, coursework and examinations. Besides, the students observed that their peers demonstrate concern and offer support for their educational progress. Their peers like them to consistently attend lectures, exhibit friendliness, and reciprocate the same level of liking as they do towards others. Possibly, the support these students get from their peers encourages then to make an effort to learn on their own. As a result of the support the students receive from their peers, the students are more inclined to initiate the process of learning knowledge, since they hold the assurance that their peers will not ridicule them. Consequently, this facilitates the cultivation of self-directed learning.

Furthermore, the results of the individual effect of perceived teacher support and perceived peer support on self-directed learning opens up an interesting issue about the factor that best predicts self-directed learning. The interesting thing is that compared to peer support, the students' perception of teacher support was the stronger contributing factor to self-directed learning. This can be attributed to the persistent encouragement provided by teachers to students in order to foster the learning of their Communication Skills, particularly when confronted with difficulties. This compels students to exert themselves in independent learning endeavours, so ensuring that their lecturers do not perceive their efforts as futile. Indeed, past research emphasises that teacher support plays a key role in promoting independent learning (Schweder & Raufelder, 2019).

Implication for Research and Practice

This study reveals some theoretical and practical implications. From a theoretical point of view, core outcome of this study is to develop a model that allows a better comprehension of how perceived teacher support and perceived peer support influence self-

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directed learning of Communication skills among Engineering undergraduate students at technical universities in Ghana. Extensive works have been conducted on these variables. However, most of these studies examined the link between teacher support and self-directed learning or peer support and self-directed learning. In furtherance to this, most of them were conducted within the context of EFL. Different from those studies, the present study evaluated the three variables simultaneously among university students within an ESL context.

From a practical perspective, the study revealed positive effects of perceived teacher support and peer support on self-directed learning. Hence, it is imperative for teachers to discern the specific teacher activities that elicit favourable perceptions from students, in order to make efforts to enhance these activities. For example, it is crucial that teachers demonstrate a genuine interest in the holistic development of their learners, encompassing both their academic progress and personal welfare. Teachers should also actively foster an environment wherein students are encouraged to provide mutual assistance and engage in collaborative learning experiences through the implementation of classroom activities such as working together in small groups to ensure that everyone in the group learns and understands assigned learning materials. Cooperative learning, in turn, facilitates peer support, hence fostering self-directed learning.

CONCLUSION

The aim of the study was to evaluate the effects of perceived teacher support and perceived peer support on self-directed learning of Communication skills. The findings confirmed a positive effect of teacher support on self-directed learning as well as a positive effect of peer support on self-directed learning. It appeared that in learning the Communication Skills course, the first-year Engineering undergraduates who perceived teacher support, which incorporates care and assistance from teachers, feedback on students' work, encouragement to excel in learning the Communication skills course and fostering a friendly relationship, tend to participate in self-directed learning. It also appeared that the first-year Engineering undergraduates who perceived peer support, characterised by a genuine interest in their educational progress, consistent attendance of lectures, optimal performance in academic tasks such as assignments, coursework, and examinations, as well as the display of friendliness, are more likely to engage in self-directed learning. It is worth mentioning that in as much as both teacher support and peer support can promote self-directed learning, compared to perceived peer support, perceived teacher support has a stronger probability of prompting the learners to participate in self-directed learning.

The notion of self-directed learning has attracted considerable interest among numerous scholars (Geng et al., 2019; Knowles, 1978), prompting additional researchers to examine the relationship between teacher support and self-directed learning (Pan & Chen, 2021; Tran & Vuong, 2023), as well as peer support and self-directed learning (Murniati et al., 2023; Sukkamart et al., 2023). However, it is important to note that, as of current

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knowledge, there has been no research conducted to examine the simultaneous relationship between perceived teacher support, perceived peer support, and self-directed learning. Nevertheless, existing literature has consistently demonstrated the significance of both teacher support and peer support in facilitating self-directed learning. This research contributes to empirical knowledge of perceived teacher and peer support as concurrent antecedents of self-directed learning of Communication skills among undergraduates enrolled in different Engineering programmes at technical universities in Ghana.

Limitation and Future Studies

This research has some limitations. One notable limitation of this research is in its utilisation of a cross-sectional approach. However, it is important to note that despite its limitation, cross-sectional data can offer valuable insights for longitudinal investigations. Thus, a future longitudinal study should be considered to clarify the effect of perceived teacher and peer support on self-directed learning of Communication skills from a Ghanaian perspective. Second, only Engineering students, served as the target population, though students pursuing other programmes study Communication skills. Thus, future studies can examine the effect of perceived teacher and peer support on self-directed learning of technical university students. One further limitation pertains to the research approach employed in the study. This study could have been enhanced by incorporating a qualitative data collection technique, such as conducting interviews with students. This would have allowed for a deeper understanding of students' perspectives on the activities that foster favourable perception of teacher and peer support. Therefore, future studies can employ a mixed method approach to assess the relationship understudy.

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