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An Overview: Shyness and Career Development of Engineering Students

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Abstract: Shyness is a universal problem that happens among students, including engineering students. Shy students have a high introverted trait, and they are more suitable to choose a non-social career. However, a career as an engineer requires someone to possess skills and becomes highly competent, besides not being shy to communicate and deal with various social situations. This made engineering graduates unemployed and contributed to the unemployment rate of the country. The study was conducted through Systematic Literature Review (SLR). The literature reviews in this research were obtained from Springer, IEEE, and Science direct as the core references. From 180 articles, this study only reviews 50 articles after the eligibility process. This article discusses the shyness problem and its relevance to engineering students' career development. The strategies to eliminate shyness are also discussed in detail based on the review articles. Among the strategies that are used in previous studies were group discussion through problem-based learning, communication skills training, drama, participation in extra-curricular activities, cooperative learning, teamwork, and leadership activities.

Keywords: Shyness, Career Development

1. Introduction

Many employers nowadays feel that it is extremely difficult to get skilled manpower to fill the vacancy of highly skilled workers. Nadzri, Rosli, Bakar, & Baharudin (2015) found that 41% of employers state that skilled workers in various sectors are indispensable in the country. This is proof

that there are 23.9% of skilled worker vacancies in the fourth quarter of 2018 (Department of Statistics, 2019). According to Fajaryati and Akhyar (2020), there are vacancies reported by the industry, but employers face difficulties in finding qualified candidates to fill the post. This can be proven through a National Associated Manufacturing (NAM) report stating that there is a skill gap that exists in almost all areas of work to meet industry needs with the skills employed by the workers (Mohd Salleh et al., 2008). Hence, for this reason, the candidates that have been interviewed are not employed because they do not meet the requirements set by the industry.

A mismatch between the skills possessed by graduates and the skills required by employers in the field of engineering could not be denied (Rajan, 2010). This is because some students do not care about the skills that need to be developed within the university years and are sceptical about the field of work that should be completed after graduation (Swanson & Fouad, 2010). There are also graduates who are trying to join the industry but are unlucky and eventually unemployed or venture into other areas of interest (Rauf & Rauf, 2014). This situation contributes to the increase in statistics of non-working graduates while the industries need skilled professional workforces.

Unemployment is a huge loss to the country as the government has invested heavily in education and training whereby graduates have spent years trying to learn and obtain a degree (Rauf & Rauf, 2014). The ringgit and energy sacrifice during university also becomes useless and worthless because it does not bring benefits to graduates. Unemployment affects individual physical and mental health (Artazcoz, Benach, Borrell, & Cortès, 2004) due to feelings of pressure (Eksan, 2016). The unemployed individuals have low social status (Artazcoz et al., 2004), having a personal crisis, and low self-esteem because they could not highlight the abilities that they possess (Eksan, 2016; Rauf & Rauf, 2014). In addition, unemployed individuals become unproductive (Yussof, Ismail, & Sidin, 2008).

Unemployment among graduates is caused by several factors. The employer is the biggest factor that contributes to the unemployment rate of graduates. However, employers could not be blamed for unemployment problems of engineering graduates because according to Singh & Singh (2008), competition is the key factor that motivates the industry to be more efficient in planning strategies that will improve production, service and product quality. This situation urges employers to be careful in selecting workers. Employers are seen to be looking for experienced workers and graduates who are not only good in technical skills but also have high competency of generic skills (Rasul et al., 2009; Singh & Singh, 2008; Zaharim, Omar, Basri, Liza, & Isa, 2009).

Communication skill is among the most important skills needed by current employers (Mohd. Salleh et al., 2008). However, this skill is the most significant weakness of engineering graduates due to high shyness (Hanapi, Kamis, Tee, & Hanapi, 2016; Hussin, Zakaria, & Salleh, 2012; Mustapha, Husain, Syed Mohamad, & Mokhtar, 2014). The problem of shyness needs to be addressed at the university level, so students are not left behind in developing their career to avoid unemployment after graduation.

The study carried out by Ullah, Alvi, and Soomro (2021) found that shyness has a negative influence on career success and career success partially mediates the relation of shyness with life satisfaction. According to the researchers, shyness causes a bad impact on a person's skills development, especially communication skills. Engineering is a social related career, so engineering students must have good social skills. This means that shyness influences students' career development because shy students do not have good social and communication skills.

1.2   Shyness amongst engineering students

Shyness causes universities graduates to be unemployed or working in other fields that are not equivalent to their degree (Myers, 2005; Zakaria, Masduki, & Ismail, 2018). Shy students tend to be unemployed after graduation because they were not involved in developing their career during the university years (Phillips & Bruch, 1988; Ullah, Alvi, & Soomro, 2021). Shy students have poor social and communication skills where this affects their chances of pursuing career exploration (Hamer & Bruch, 1997; Myers, 2005; Phillips & Bruch, 1988; Zakaria, Masduki, & Ismail, 2018). The social and communication problems cause students not to be accepted in the industry as these two skills are the

benchmarks of individual successes as an effective team member at work (Bridgstock, 2009; Mitchell et al., 2021).

Engineering students must be very effective in the world of work, so, they need to prepare themselves with the skills needed by today's industrial market. Still, previous research found that engineering graduates are lacking in social and communication skills as demanded by the employer (Zakaria, Masduki, & Ismail, 2018). Shyness among students causes negative impacts on their career growth. Shy students are more likely to choose a non-social career that requires less communication (Holland, 1997). However, engineering students need to master themselves with oral communication competency in order to become professional engineers (Bhattacharyya, 2014). In addition, they need to communicate and make presentations during studies and later on at work.

Shyness also prevents students from career exploration as they are unsure about the field that they are involved (Phillips & Bruch, 1988; Nagib & Wilton, 2020). Shy engineering students will have trouble getting jobs and if they work, they will face greater problems because they could not communicate effectively and lack confidence. Communication skill is one of the seven elements in the soft skills that all engineering students must possess and becomes a value added by potential employers (Hairi, Ahmad Toee, & Razzaly, 2011; Zakaria, Masduki, & Ismail, 2018). However, shyness in students prevents them from developing communication skills and self-efficacy. A preliminary study using a set of online questionnaires has been conducted on the first-year undergraduate students at four technical universities in Malaysia. In this study, as many as 44% of students found they were shy. 70% of students in this study were found to be shy to ask questions and 74% of students were shy to express their opinions during discussions in the class.

1.3 The correlation between career development and shyness

Theoretically, the barrier to the crystallization of the vocational self-concept is the impact of shyness because the development of self-concept comprises social interactions (Hamer & Bruch, 1997; Zakaria, Masduki, & Ismail, 2018). The self is defined not separately but in relation to others. So, the concern about negative judgments of shy individuals can lead to limited experiments on self-expression and misconceptions against other people's responses, causing a sense of self-confusion. Phillips and Bruch (1988) examined the perception that shyness is inversely proportional to some behavior related to early career development. The results show that shy undergraduate students are less likely to find information on career, do not know to make the decision, and lack interest in the interpersonal career. With regard to career behavior, the report from a 30 years longitudinal study of shy childhood by Caspi, Elder, and Bem (1987) found that shy men were a bit slower to enter a steady career phase, compared to those who were not shy. In addition, shy men also hardly achieve proper career objectives and suffered severe career instability during the age of 30 to 40.

Shy women are reported to follow conventional marriage patterns, childbirth, and being housewives, as opposed to non-shy women. Shy women also rarely have a career after childbirth. On the other hand, in the case of identity formation, Hamer & Bruch (1994) argued that shyness shows an unrelated relationship with identity achievement. Difficulties in the formation of psychological identity resulted in a delay in career development (Hamer and Bruch, 1994). Research on the impacts of shyness by Zimbardo (1977) focuses almost exclusively on the relationship between shyness and the difficulty in social interaction, whereby shy students experience more loneliness, compared to those who are not shy. Shy students are found to be less informed and inconsistent in determining their career. Zimbardo (1977) holds the view that shyness has a wider impact on social adjustment and work of individuals.

Taormina (2019) in his studyon 375 full-time employees exposed that shy (compared to non-shy) employees scored significantly lower on Subjective Career Success, Self-Confidence, and Emotional Intelligence; while scoring significantly higher on work-related Emotional Exhaustion. This finding is in line with the study of Masek and Masduki (2017) who argued that shyness is a social problem that

starts from childhood and affect children's skill development.

According to Wang et al. (2019), in terms of job exploration, both aspects of cognitive thinking and behavior will prevent exploration efforts as this situation interferes with effective social interaction. Due to the lack of self-concept, career exploration is also a problem for shy individuals. Shy individuals tend to have low self-esteem, self-reflection, and career exploration. It has been argued that negative distrust (defined as a tendency to experience unpleasant emotional states and has a negative self-concept) is reported to be inversely proportional to work satisfaction and positively correlated to the behavior of being fired or dismissed from work (Necowitz and Roznowski, 1994). Furthermore, the study of Roney and Soicher (2021) towards 295 employees working at a variety of professions revealed that self-concept projected greater life satisfaction; whereby this is partially mediated by affective job commitment, work autonomy, and altruistic citizenship behaviors at work.

Lent, Brown, & Hackett (1994) suggest that negative distrust can undermine the accuracy of the information that contributes to self-efficacy assessment of job performance related to career development. Together these studies provide important insights into the negative impact of shyness on the individual's social and interpersonal skills, especially in communication skills in their career development process. The study done by Bober et al. (2021) found new mediating aspects for direct relations between shyness and self-esteem in the form of two self-presentation styles. The result shows that the tendency of shy people to avoid others can have a lower impact on their sense of self-esteem when they try to present themselves. On the other hand, shyness may have a stronger impact on their sense of self-esteem, especially at work.

2. Methodology

Systematic searching strategies using Systematic Literature Review (SLR) were run involving three processes: identification, screening, and eligibility.

2.1 Identification

During the identification process, appropriate keywords are first determined. The identification process depends on the online thesaurus, keywords used by previous research, keywords recommended by Scopus, and keywords recommended by experts (Shaffril et al., 2020). The searching process was run on enhanced keywords either by using advanced searching techniques (Boolean operator, phrase searching, truncation, wild card, and field code functions separately) or by merging these searching techniques into a full searching string. Manual searching techniques such as handpicking, and snowballing were also involved.

Table 1: Results of identification process

Section	Main keywords	Enriched keywords
Strategies to eliminate shyness to enhance engineering/ higher institutions students' career development	Strategies Eliminate Shyness Engineering students Higher institution students	Strategies = Approach, how to Eliminate = Get rid of, avoid, prevent Shyness = apprehension, reticence Engineering students = technical students Higher institution students = undergraduate, university students
	Enhance Career Development	Enhance = build up, increase, heighten Career = job, work Development = advancement, improvement, expansion, progress

2.2 Screening

This study screened all the 180 selected articles by selecting the criteria for articles selection which is done automatically based on the sorting function available in the designated databases. The same criteria were used across the selected databases and whenever the sorting functions are not available, the articles were omitted manually. Due to there being only a few studies related to the strategies to eliminate shyness for engineering students in past decades, this study also considers higher institutions students. Therefore, engineering and higher institution students with the timeline between 1995 and 2018 were selected as one of the inclusion criteria. Furthermore, to ensure the quality of the review, only articles with empirical data published in a journal, book, or book chapter are included. Moreover, only articles published in English are included in the review to avoid confusion and misunderstanding (Table 2). This process had excluded 70 articles as they did not fit the inclusion criteria and the remaining 110 articles were used for the eligibility part.

Table 2: Screening process

Criteria	Inclusion	Exclusion
Timeline	1995 to 2018	Before 1995
Publication Type	Article journal, book, chapters in book	Proceeding, newspaper, review paper
Language	English	Non-english

2.3 Eligibily

During the eligibility part, the authors manually observed the retrieved articles to ensure all the remaining articles (after the screening process) meet the criteria. This process was done by reading the title and abstract of the articles and if there is still no strong understanding gained on the relevance of the selected articles to the study, the article's content was examined. This process excluded 70 articles due to in a form of a review paper, replicated records between databases, the objective of the selected articles is not focusing on students, and published in other languages. In general, there were 50 designated articles for the review.
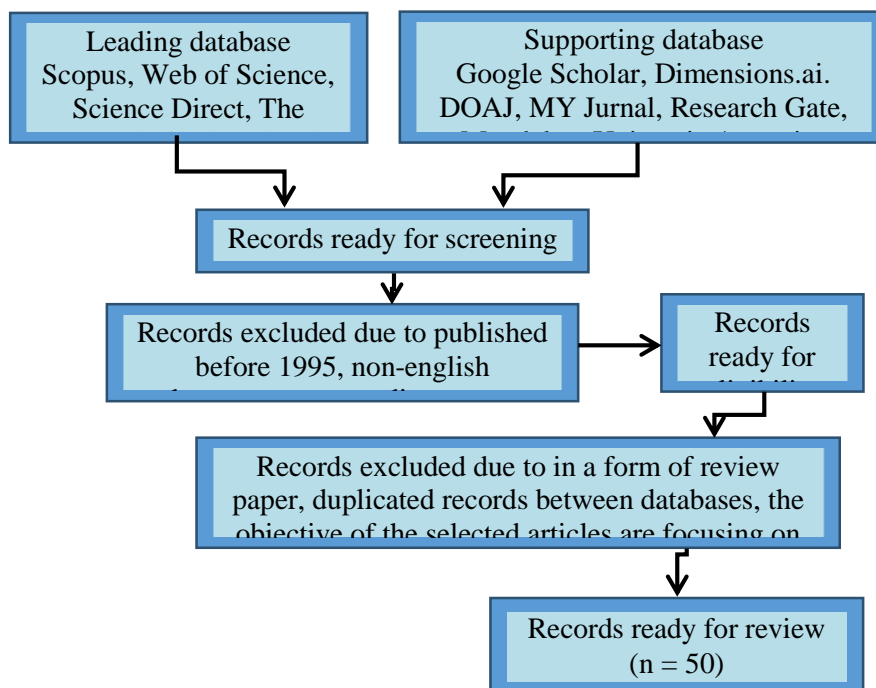

Figure 1: The process of selecting the articles for the review

3. Result and Discuccion

From 50 articles that have been reviewed, only seven articles met the criteria of this study. Different authors have conducted research on the strategies to eliminate shyness in a variety of ways. Table 3 below is the summary of strategies undertaken in previous studies to address the problem of students' shyness.

Table 3: Summary of strategies to eliminate shyness

	Researcher	Sample	Method/Strategy	Activities
1.	Awang & Daud (2015)	Engineering students	Quasi-experiment	Group discussions through Problem-based learning (PBM)
2.	P'Rayan & Shetty (2008)	Engineering students	Communication Skills Laboratory Course	Oral presentations, group discussions, interviews, computer-assisted learning, public speaking
3.	Waitz & Barrett (1997)	Higher learning institution students	Experimental Projects Laboratory with communication practicum	Co-operative learning, hands-on activities, use of technology, mentoring system and student motivation
4.	Martin & Thomas (2000)	College students	Model of Psychoeducation for Shy College Students.	Techniques of relaxation and confronting the dreaded situations of self-doubt, social skills and communication skills
5.	Young et al. (2014)	Engineering students	Participation in co-curricular activities	Teamwork, reflective behaviour, communication activities
6.	Carter et al. (2016)	Engineering students	Application of Reason Model via questionnaire	Cooperative learning, humanitarian projects, leadership activities
7.	Zaghloul (2018)	Preparatory year students	*Quasi-experiment*	Creative drama

3.1 Discussion

Awang and Daud (2015) conducted a quasi-experimental study based on the Ecological Model of the Communication Process (Foulger, 2004). Researchers implemented a group discussion method through Problem-Based Learning (PBL) on treatment groups where they are given any problems to be identified by thinking through the question such as 'how' and 'why'. Students discuss and collaborate on finding the information provided. Each student from this treatment group is given the opportunity to express their opinion verbally in the presence of a mentor as a facilitator. Although the study found that the PBL method was appropriate to improve communication skills and eliminate shyness among students, the study conducted by Masek (2016) found that in the PBM method, students could become active or inactive speaker, depending on their involvements.

P'Rayan and Shetty (2008) conducted an intervention method for 120 engineering students in India to address the shyness problem in communicating. This study is based on the assumption that if students are helped to overcome their communication anxiety at the first place, their communication skills will be enhanced and the efforts taken by the lecturers to develop student employability skills will be more effective. Researchers developed the Communication Skills Laboratory course which includes oral presentations, group discussions, computer-aided interviews and learning. At the end of the course, students are examined by discussions in groups and public speaking. This study found that the intervention method was very effective in improving students' communication skills and reducing shyness. Training in oral presentation and public speaking helps students to overcome their stage fright and might reduce their shyness (Soomro et al., 2019).

Waitz & Barrett (1997) in their study have developed Experimental Projects Laboratory with communication practicum where laboratory experimental and communication laboratory projects are two coupling subjects providing an environment for teaching communication skills. Among the strategies implemented include cooperative learning, hands-on activities, technology utilization,

retention systems, and student motivation. In this study, the researchers did not report on the theory or model they referred to, but only stated some justifications for each strategy used, while according to Kawulich (2009), theories form the concept of what we see and how we look at a problem are vital. Co-operative learning and hands-on activities help students to participate in social interactions and making them used to communicate in a group of people, thus might reduce their shyness (Masek & Masduki, 2017).

Martin & Thomas (2000) highlighted the concept of group work in counseling called the Psychoeducation Group Model for Shy College Students. This study was started by advertising and taking students, along with screenings conducted through informal interviews. Participants of this study are taught with specific techniques such as relaxation techniques and how to deal with dreading situations that are self-embarrassing. Participants are also trained with social skills and communication skills that help them to overcome their shyness. According to Soomro et al. (2019), communication apprehension can be reduced by giving students more exposures and experiences in communication and social interactions.

Using the Student Engagement Theory (Astin, 1984), Young et al. (2014) studied the effectiveness of co-curricular activities on student communication skills. According to researchers, certain co-curricular activities can enhance student communication skills. Generally, students with good communication skills will have high self-esteem and low communication apprehension. So, these students would have a low level of shyness.The approach used in the investigation by Carter et al. (2016) is similar to that used by Young et al. (2014). The study on engineering students focusing on communication skills, leadership skills, and teamwork skills. Researchers argued that communication skills and leadership skills were at a high level only if the students often involved in the clubs and hold the leadership position. Humanitarian projects and cooperative learning activities also demonstrate significant insights into communication skills and leadership skills. Good communication skills among students can reduce their shyness to communicate in social situations. A study conducted by Zaghloul (2018) focuses on creative drama to enhance communication skills, thinking skills and creativity of preparatory year students. Compared to the control group, activities conducted in the creative drama of experimental group could enhance those skills and eliminate students' shyness. This study is supported by Zakaria, Masduki, and Ismail (2018) who argued that students who actively participated in extra-curricular activities, especially in clubs that incorporate more communication skills can help to reduce shyness.

4. Conclusion

It is important for engineering students to develop their career since the first year they are in university. However, shyness prevents students from being active in their career exploration and limit their skills, especially communication skill. Based on previous studies, various strategies have been undertaken to address shyness problems among students where most planned activities involve communication and group activities to promote social interaction. The activities carried out also have the potential to increase students' self-confidence and self-esteem to deal with shyness. Poor social skills among shy students are the result of lacking in training in interpersonal communication, so studies that provide social training to students should be carried out to see if the social training has a positive impact on their social skills (Myers, 2005). With this, when shyness problem can be solved at the early stage, engineering students' career development can be well developed while they are still at the university. Besides, when communication skills of engineering students are enhanced, their chances to be employed after graduation would become higher.

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