

English Language Speaking Anxiety, Self-Confidence and Perceived Ability among Science and Technology Undergraduate Students: A Rasch Analysis

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ABSTRACT

The purpose of this paper is to analyse English language speaking anxiety, self-confidence, and perceived ability in English oral communication among Science and Technology undergraduate students. It also aims to identify any significant differences in these constructs based on selected students' demographic variables. The study employed the survey method with a 41-item questionnaire administered to a voluntary response sample of three hundred 3rd and 4th-year science and technology undergraduates from three Malaysian public universities. The Polytomous Rasch model was used to analyse the data. The analysis showed that the participants experienced English speaking anxiety, low confidence, and high perceived ability in English oral communication. There were significant mean differences in English speaking anxiety across the type of university as well as in confidence and perceived ability based on academic program. The participants were more confident and could perform better in familiar situations and communicate on familiar topics to

familiar audiences. The findings suggest that the participants need more training on English oral communication. More authentic situations are also needed for them to practise and improve their proficiency levels. Other suggestions include providing lecturers with training modules, re-assessing the current language policies, and implementing certain programmes at the tertiary education level. Language programmes could be directed towards more social situations to enable

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undergraduates to make English a social practice, lower English speaking anxiety, and boost confidence.

Keywords: Confidence, English oral communication skill, perceived ability, Rasch Model Analysis, science and technology undergraduates, speaking anxiety

INTRODUCTION

The English language is considered a lingua franca due to its dominance in many social, economic, scientific and political activities (Crystal, 2004; Nishanti, 2018; Pandarangga, 2015; Pennycook, 2014; Reddy, 2016). Reports have shown that about 750 million people use English as a second language (ESL), and it is prioritised in around 70 countries in the world (Reddy, 2016). Furthermore, English language learners have reached 1 billion, while roughly 2 billion people have mastered the language, with an estimation that half of the world population might be English proficient in the next few decades (English Cultural Council as in Xue & Zuo, 2013). The English language has also become the medium of instruction in many higher education institutions, and it has also been used as a criterion with which students secure admissions into tertiary education programs (Pandarangga, 2015). As such, English communication competency is considered among the highly significant requirements of university graduates' quality in Asia (UNESCO, 2012).

Globally, many countries are constantly working to improve English language proficiency among their people and learners, as English has become the most important

language in the world (Hudson & Hudson, 2003). Companies and institutions hire employees who can communicate in the English language efficiently within a wide range of workplace communicative events due to the substantial roles the language plays in the current worldwide transactions (Pandarangga, 2015; Sheth, 2016). The same idea is mooted in Roshid and Chowdhury's (2013) notion that employers are looking for graduates with high English communication skills, mainly those who can explain ideas, identify issues, and solve problems related to their work constructively. For instance, English communication skill is an imperative employability requirement in India to get a better job (Clement & Murugavel, 2015). Clement and Murugavel further emphasize that engineering graduates can only internationally communicate if they are proficient in English communication skills, mainly those related to their profession. Wijewardene et al. (2014) assert that competency in English—especially the spoken and written—is among the crucial factors determining graduates' employment in the private and public sectors in Sri Lanka. The same trend is seen almost worldwide.

Of the four language skills, speaking skill is considered the most important. Ur (1996) argues that those who know the language speak it, implying that it is important to use it effectively rather than knowing it (Scrivener, 2005). We live in a time where the need to speak English fluently is dire, especially for those who want to advance in certain fields of human endeavours (Al-Sibai, 2004). The literature

on English oral proficiency has shown several factors affecting its improvement. These factors include speaking anxiety (Ahmed et al., 2017; Bux et al., 2015; Dordinejad & Ahmadabad, 2014; Kumar, 2018; Ramamurthy, 2019; Salem & Al Dyyar, 2014; Zhang & Zhong, 2012); low self-confidence (Gürler, 2015; Kalanzadeh et al., 2013; Mandokhail et al., 2018; Tridinanti, 2018) and perceived ability in English oral communication (Alawiyah, 2018; Linnenbrink & Pintrich, 2003; Pajares, 1996; Sunyi, 2017; Zahiri et al., 2017). This study primarily aims to analyze English language speaking anxiety, self-confidence, and perceived ability in English oral communication among science and technology undergraduate students using the Rasch Model in Malaysia.

English Language Anxiety and its Effects on Spoken/Oral Interaction

Horwitz et al. (1986) describe language anxiety as a multiplex phenomenon of “self-perceptions, beliefs, feelings, and behaviours related to classroom language learning arising from the uniqueness of the language learning process” (p.128). Spielberger (1983) defines language anxiety as “a subjective feeling of tension, apprehension, nervousness, and worry associated with an arousal of the autonomic nervous system” (p.1). It could be classified into two categories, namely ‘trait anxiety’ and ‘situational anxiety’ (i.e., state anxiety) (Akkakoson, 2016; Spielberger, 1983). Trait anxiety is the anxiety that language learners experience in every situation (Pappamihiel,

2002). If individuals fail to minimise this negative feeling, it becomes permanent in their temperament (Riasati, 2011). On the other hand, situational anxiety is anxiety expressed by a second language learner in specific situations (MacIntyre, 1999). This kind of anxiety is usually felt because of the lack of familiarity of language learners with the particular situation in which they are to use the language, and once they become familiar with it, their anxiety diminishes or even vanishes (Riasati, 2011).

Interestingly, speaking skills in a second or foreign language is the most anxiety-inducing skill among individuals (Zhang & Zhong, 2012). Furthermore, research has revealed a connection between English speaking anxiety and students’ speaking fluency; meaning that speaking anxiety has an unfavourable effect on learners’ English-speaking fluency (Salem & Al Dyyar, 2014) and, in particular, students’ oral presentation as well as their conversation with English native speakers (Bux et al., 2015). Therefore, a number of research (quantitative and qualitative) has been conducted to identify the causes of speaking anxiety, its destructive effects on speaking as well as how the problem can be addressed (Ahmad et al., 2017; Bux et al., 2015; Kumar, 2018; Ramamurthy, 2019; Salem & Al Dyyar, 2014). For instance, Ahmad et al. (2017) found the inter-language meaning system as the cause of postgraduate students’ English language speaking anxiety, while Kamaruddin et al. (2019) found low self-esteem and social anxiety as the factors contributing to the listening and speaking

anxieties among Malaysian university students majoring in non-English programs. Moreover, Mulyono et al. (2019) identified negative attitudes, language barriers and intercultural communication apprehension as the main factors provoking English-speaking anxiety among non-English native speakers studying in the Indonesian universities.

Moreover, Ramamurthy (2019) found fear of being negatively evaluated as the main factor for English speaking anxiety among diploma students studying at an international college in Malaysia. Amiri and Puteh (2018) found that several factors such as insufficient linguistic competency, inadequate knowledge of the presentation's content, students' negative perception towards the examiners, and examiners' linguistic deficiency in understanding presentations lead to speaking anxiety among international students studying doctoral programs in different Malaysian universities. Sadighi and Dastpak (2017) found that fear of making mistakes, being negatively evaluated, and inadequate vocabulary knowledge were the major causes of speaking anxiety among ESL Iranian students. It is important to maintain that speaking anxiety level might differ due to demographic variables (Badrasawi et al., 2020). In conclusion, it could be inferred that language anxiety affects the speaking performance of ESL/EFL learners, and the higher the level of language anxiety, the worse their performance in speaking will be, and vice versa.

Perceived Ability and its Effects on Spoken/Oral Interaction

Perceived ability refers to individuals' self-perception regarding their ability to perform effectively in a specific situation based on their skills and capabilities. A good example is the Common European Framework of References (CEFR), where perceived ability is directly linked to learners' ability to achieve the stipulated 'Can do' statements (Alderson, 2017). The CEFR describes what learners can do across five language skills: spoken production, spoken interaction, reading, listening and writing (Alderson, 2017). For all five skills at each level, there are sets of detailed 'Can Do' statements. For example, the spoken interaction focuses on the learners' production and participation in conversations and discussions. Perceived ability is important for students to participate in maintaining, starting, taking turns and ending conversations. Without adequate perceived ability, learners will stumble thus fail to achieve the target performance stipulated in the 'can do' statements.

Literature has shown that perceived ability is among the factors that affect students' English oral communication skills. This is not because of their deficiency in mastering the linguistic aspect of communication, but it is as a result of the negative feeling they usually have about themselves and the audience such as communication apprehension, fear of making mistakes and fear of negative evaluation as affirmed by Horwitz et al. (1986). Speaking anxiety tends to be higher when the ESL/EFL speakers perceive their

speaking ability to be low, and vice versa. Cognitive component, as emphasised by Shrauger and Schohn (1995), is an integral part of individuals' perceived ability. It refers to the self-evaluation of performance, meeting of own expectations and continuous excellence compared to others. Several studies have contended that English language learners who perceive their ability as high are confident to successfully engage themselves in English conversations with others expressing their ideas overtly, and the reverse is also true (Alawiyah, 2018).

When people are optimistic in performing excellently in a task, they become strongly motivated and driven by their enthusiasm and interest to achieve the desired goals (Linnenbrink & Pintrich, 2003; Pajares, 1996; Sunyi, 2017). Zahiri et al. (2017) studied the effects of speaking anxiety and perceived ability on monologue speaking skills of students at a state senior Islamic high school in Medan, Indonesia. They found that both speaking anxiety and perceived ability affected students' monologue speaking skills. While the former adversely affected students' speaking skills, the latter had a positive effect on it. The more anxious students are in speaking, the worse the speaking skills will be. Similarly, the higher their perception of their ability, the better they will be in speaking skills. Desmaliza and Septiani (2017) showed a significant relationship between students' perceived ability and their speaking skills, positively influencing the performance of students in oral communication activities.

Confidence and its Effects on Spoken/ Oral Communication

Koriat et al. (1980) describe confidence as the belief in oneself to perform tasks successfully. It could also refer to one's realistic sense of capacity and possessing sufficient knowledge. Brown (2004) stresses that successful activities require a high level of self-confidence, including second language acquisition (Kalanzadeh et al., 2013). Hart (1989) purports that confident learners would most likely get the task done. Confidence in spoken interaction is usually associated with the speakers' certainty about using the language. Thus, confidence plays a crucial role in motivating learners to communicate (Tanveer, 2007). The higher the confidence, the most likely the learners will be involved in communication activities. Tsou (2005) reported that high self-confidence was positively correlated with oral performance and concluded that self-confidence is crucial in learners' inclination to communicate. It is supported by Stenstrom (2014), who asserts that confidence is important in spoken interaction as it is a two-way process. Other researchers found a positive, strong relationship between self-confidence or self-esteem of FL or SL learners and their oral proficiency of speaking skills (Gürler, 2015; Mandokhail et al., 2018; Tridinanti, 2018).

Study Setting

In Malaysia, English has its status as an important second language, and it is used as the medium of instruction for science and technology in higher institutions. In

addition, it is extensively used in various settings, for instance, social, commercial and national and international transactions. The Malaysian educational system values English language acquisition among students at all school levels, and the Malaysia Education Blueprint (2013-2025) has stressed improving the students' English language proficiency at all stages. Considerable efforts have been devoted to improving graduates' English language proficiency to work in a globalised economy whereby the English language is the international language of communication, as clearly mooted in the Blueprint 2013-2025 (Ministry of Education, 2012). More importantly, this focus encourages the graduates to participate in the workforce and contribute to the country's development in the future. Graduates proficient in English and who have leadership and technical skills get more opportunities to find a job in their respective fields (Ismail, 2011).

In order to improve the level of English language proficiency from preschool to tertiary education, Malaysians have adopted CEFR with the establishment of the English Language Standards and Quality Council (ELSQC) in 2013. Malaysian Science and Technology undergraduates went through lessons for ESL and CEFR-aligned tests such as Malaysian University English Test (MUET), Cambridge Placement Test (CPT) and an English assessment test administered by the British Council (Aptis) before graduating. The purpose of taking at least one of these tests is primarily to measure their proficiency in the language. Since CEFR provides a globally accepted

measurement framework, educational institutions and employers can easily compare qualifications to other exams in their countries. The minimum expectation for university graduates is B2 which ensures they can understand more complex texts, handle more abstract topics and technical discussions, and communicate and interact comfortably with native speakers. C2 is the highest level CEFR scale of achievement, required only for those entering certain professions, such as English language teachers.

However, undergraduate Science and Technology students must be concerned because a recent report has indicated an urgent need for more qualified and skilled graduates in science, technology, engineering and mathematics (Chin, 2016). Overall, extensive research has shown that undergraduate students have low proficiency (i.e. not up to the desired levels) in the English language (Ismail, 2011; Musa et al., 2012; Nair et al., 2012, Rusli et al., 2018). The language competence of Malaysian undergraduates is still a long way from satisfactory level though they have learned English for 11 to 13 years in schools (David et al., 2015). As a result, communication skills amongst Malaysian graduates have deteriorated (Shakir, 2009). The Malaysia Education Blueprint states that "poor English proficiency among graduates has been consistently ranked as one of the top five issues facing Malaysian employers since 2006" (Ministry of Education, 2012, p.12). In addition, recent reports have shown that the number of unemployed Malaysian graduates are increasing due to their lack

of the required levels of English speaking skill to get or secure a job (Free Malaysia Today, 2017; The Sun Daily, 2018). Besides, the Salary Surveys 2016 by the Malaysian Employers Federation (MEF) found that over 90% of respondents were required to improve their English capability to get a job (Malaysian Employers Federation, 2016).

Evidently, in such pressing situations where further investigation is needed, this study aims to analyse English language speaking anxiety, self-confidence, and perceived ability in English oral communication among undergraduate science and technology students using the Rasch Model. Also, it aims to find the significant differences in mean scores of the factors about selected demographic variables (i.e. gender, academic year, university type/category and faculty).

METHODOLOGY

This study used the survey method to determine English language speaking anxiety, self-confidence and perceived ability in English oral communication among science and technology undergraduate students. Based on the related literature, items measuring *Foreign Language Anxiety Scale* (FLAS) were pooled from previous studies (Ali, 2017, McCroskey, 1970; Pappamihiel, 2002; Yim & Yu, 2011) while items measuring *Confidence* and *Task Difficulty* were based on a questionnaire that was developed to measure confidence and task difficulty in oral proficiency testing, a study by Kassim and Zubairi (2003). The Common European Framework of

Reference (CEFR) Can-Do Statement rubrics was applied to measure the perceived ability. Altogether, there were 41 items on a five-point Likert scale, categorised into three sections: *English speaking anxiety* (ANX) (12 items); *Confidence in oral communication/interaction* (CON) (19 items); *Can-Do statements (perceived ability in oral communication)* (CAN) (10 items). These items were piloted, and the Cronbach's Alpha values for the three constructs were 0.87, 0.74 and 0.87, respectively. Two Malaysian research universities and a comprehensive university offering Science, ICT and Engineering programmes were identified as the study population. Third- and fourth-year undergraduate students from those academic programmes were invited to participate in the study, from which three hundred students volunteered. The questionnaires were administered in person to those who agreed to participate— However, some who were unable to join answered the questionnaire via Google Forms. The breakdown of the sample in terms of the programme of study and institution is presented in Table 1.

The collected data were analysed based on the Polytomous Rasch model using *Winsteps* version 4.1.0 (Linacre, 2018). Unlike other kinds of analysis, interval data are always used in Rasch analysis. It uses logit units; therefore, it is possible to get the difficulty to measure for each item and for category. All persons and items are placed on the same interval scale to see their distributions. The most difficult items to endorse are positioned toward the upper part of the scale and

Table 1
Study sample's demographic characteristics

Variable	Level	Frequency (n)	Percentage %
University	Comprehensive University	110	36.7
	Research University A	90	30.0
	Research University B	100	33.3
Faculty	Science	100	33.3
	ICT	100	33.3
	Engineering	100	33.3
Year	Third 3 rd	140	46.7
	Fourth 4 th	160	53.3
Gender	Male	116	38.7
	Female	184	61.3

vice versa. Another important point is that Rasch analysis ensures if the items contribute meaningfully to the construct by investigating the item Fit statistics. The inferential analyses (One-way analysis of variance (ANOVA) and Independent samples t-test) were also conducted to compare mean scores of English-speaking anxiety, Confidence and Perceived ability in English oral communication across selected demographic variables (i.e. university type/category, faculty, academic year and gender). The results are displayed in Tables and Figures.

RESULTS

Psychometric Properties of the English Speaking Anxiety Scale

A 12-item scale was used to measure English language speaking anxiety of the 300 Science and Technology undergraduate students from Malaysia's three selected public universities. Table 2 shows the psychometric properties for all items using the Rasch Model. It is important to note

that the two misfit items (i.e. items 6 and 10) with infit value > 1.5 were not included in the final analyses as recommended in the literature (Bond & Fox, 2015). Though the two items were recoded, they still showed misfit values. Both items were misfits as they shared the same characteristics in that they were worded positively. The item reliability was high (0.95), with separation index (3.04) > 2 ; and the reliability of a person's ability is also high (0.90) with person separation index (4.29) > 2 . For the point-measure correlation coefficients, ten items had positive values, ranging from 0.74 to 0.83. It means that all items were working in the same direction to define the English language speaking anxiety construct. The ten items' infit and outfit Mean-square statistics were within the recommended range (0.5–1.5), indicating that they contributed meaningfully to the measured construct (i.e., English speaking anxiety). Thus, the scale's unidimensionality was met, with the variance explained by the measures being 64%. The largest factor

Table 2
Reliability, separation, item fit statistics and point-Measure correlation coefficients

No	Item	Infit		Outfit		PT-Measure CORR
		MNSQ	ZSTD	MNSQ	ZSTD	
1	I feel very self-conscious about speaking English in front of others.	1.07	0.8	1.08	0.9	.77
2	I am afraid that native speakers will laugh at me when I speak English.	.96	-0.5	.94	-0.7	.80
3	I lack self-confidence when I speak in English to others.	.80	-2.6	.80	-2.6	.83
4	I always feel that others speak English better than I do.	1.14	1.6	1.09	1	.78
5	I doubt my ability to speak English properly.	.83	-2.2	.84	-2	.82
6	I enjoy speaking English with native speakers.	Misfit item (infit > 1.5) DELETED				
7	My hands tremble when I am giving a speech.	1.33	3.7	1.38	4.1	.74
8	My heart beats very fast while waiting for my turn to start a speech.	1.09	1	1.11	1.2	.78
9	While preparing for giving a speech, I forget facts I really know due to tension and nervousness.	.89	-1.4	.86	-1.7	.81
10	I feel relaxed while giving a speech.	Misfit item (infit > 1.5) DELETED				
11	When I make a mistake while giving a speech, I find it hard to concentrate on the parts that follow.	.92	-1	.94	-0.6	.79
12	While giving a speech, I experience a feeling of helplessness building up inside me.	.87	-1.6	1.03	0.4	.77
Means		.99	-0.2	1.01	0.0	
P.SD		.16	1.9	.16	1.9	
Reliability of item difficulty measures				0.95		
Item separation				3.03		
Reliability of person ability				.90		
Person separation				4.26		
Variance explained by measures				60.4%		
Unexplained variance in 1st contrast				2.3 (< 2 items) Linacre 2019.		

extracted from the residuals was equivalent to 2.3 units, which had a strength of about two items (Linacre, 2019).

English Speaking Anxiety and its Factors

Table 3 shows the order of the item difficulty measures arranged from the highest to the lowest. Figure 1 displays the hierarchy

and distribution of items and persons on the same interval scale. Overall, students easily endorsed the scale items as the person ability mean (0.27) was higher than the item difficulty mean (0.00), indicating that the participants had experienced English language speaking anxiety. The least endorsed items were placed towards the upper part of the scale, and highly

Table 4

Item fit statistics, point-measure correlation coefficients, reliability and separation (individual interview **IV**, paired discussion **PD** and group discussion **GD**)

No	Item	Infit		Outfit		PT-Measure CORR
		MNSQ	ZSTD	MNSQ	ZSTD	
Individual Interview						
IV1	Tasks that require me to respond (answer) immediately make me nervous.	1.12	1.5	1.12	1.4	0.69
IV22	I find tasks that require my response (answer) without preparation frightening.	1.19	2.2	1.26	2.8	0.68
IV3	I worry when I do not know what the interviewer is going to ask me.	0.85	-1.8	0.84	-1.9	0.75
IV4	I perform well on tasks that give me time to prepare.	1.04	0.5	1.13	1.5	0.71
IV5	Talking about familiar topics make me feel more confident.	1.05	0.6	1.06	0.7	0.74
IV6	Interacting with an interviewer I am familiar with makes me feel comfortable.	0.99	-0.1	1.03	0.3	0.73
IV7	My performance on a task depends on the interviewer that I get.	0.99	-0.1	1.03	0.4	0.70
Paired Discussion (in Peers)						
PD8	I find tasks that require my immediate response (answer) frightening.	1.10	1.3	1.12	1.3	0.68
PD9	I worry when I do not know what my peer is going to ask me.	1.27	3.2	1.25	2.6	0.64
PD10	I perform well on tasks that give me time to prepare.	0.88	-1.5	0.92	-0.9	0.74
PD11	I perform well on tasks that require me to interact with a peer.	0.88	-1.5	0.91	-1	0.73
PD12	My performance on a task depends on the peer that I get.	1.07	0.9	1.09	1	0.72
Group Discussion						
GD13	Tasks that give me time to prepare my response (answer) make me feel comfortable and relaxed.	0.72	-3.7	0.77	-2.9	0.78
GD14	I like tasks where I am given time to prepare my response (answer) while the other group members take turns speaking.	0.89	-1.4	0.9	-1.1	0.75
GD15	I worry when I do not know what my group members are going to ask me.	1.09	1.1	1.25	2.6	0.66
GD16	It does not matter to me whether I am given time to prepare my response (answer).	Misfit item (infit > 1.5) DELETED				
GD17	I perform well when I interact with group members with whom I am familiar.	0.83	-2.1	0.85	-1.7	0.77
GD18	Talking about familiar topics make me feel more confident.	0.8	-2.5	0.8	-2.4	0.78
GD19	Interacting with group members I am familiar with makes me feel more confident.	0.91	-1.1	0.93	-0.8	0.75

Table 4 (continue)

No	Item	Infit		Outfit		PT-Measure CORR
		MNSQ	ZSTD	MNSQ	ZSTD	
Means		0.98	-0.3	1.01	0.1	
P.SD		0.14	1.8	0.15	1.7	
Reliability of Item difficulty measures				0.98		
Item separation				6.28		
Reliability of person ability				0.92		
Person Separation				3.37		
Variance explained by measures				52.7%		
Unexplained variance in 1st contrast		4.07 (No issue & Disattenuated correlations are 1 or closer to 1)				

separation index (3.37) > 2. As for the point-measure correlation coefficients, all items were found to have positive values, ranging from 0.64 to 0.78. It means that all items were working in the same direction to define the construct of confidence in English oral communication. However, one item (i.e. GD 16) was deleted because it was a misfit (infit > 1.5). Other items' infit and outfit mean-square values were within the accepted range (0.5 to 1.5), indicating that they contributed meaningfully to the measured construct. In Table 4, the variance explained by the measures was 52%, and the largest factor extracted from the residuals was equivalent to 4.07, which had a strength of about four items. Therefore, it would not affect the scale as all other indicators have been met. It is supported by the values of Disattenuated correlations, which were one or very close to 1 (Linacre, 2019).

Self-Confidence in English Oral Communication

Overall, Figure 2 shows that the participants lack confidence in English oral interaction

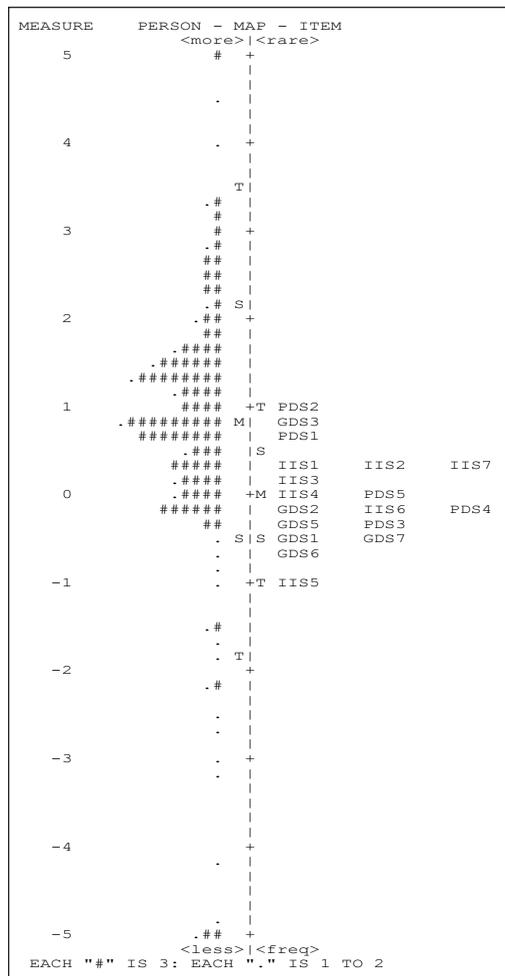


Figure 2. Person-Item Map (interview IV, paired discussion PD and group discussion GD)

or communication in individual interviews, paired or group discussions. They were easy to endorse the items on self-confidence (0.76 logits), which was negative. Table 5 indicated that students did not feel confident when asked to speak about unfamiliar topics, speak to unfamiliar people, or not have enough time to prepare regardless of the context, either an individual interview, paired or group discussions. It is indicated by their high endorsement of the items placed at the bottom part of the interval scale. All

the items interacted on familiar topics or familiar people, and the participants had enough time to prepare in all contexts. On the contrary, the items they stated were not very worried, not frightened, and not nervous or not concentrated when they were asked to interact with other people, talk on unseen topics and interact without preparation received low endorsement.

Though the participants showed a lack of confidence in oral communication on unfamiliar topics, interacting with unfamiliar

Table 5
Item difficulty measures (confidence in English oral communication: individual interview *IV*, paired discussion *PD* and group discussion *GD*)

No	Item	Difficulty Measures	S.E
PD 9	I worry when I do not know what my peer is going to ask me.	1.05	0.07
GD 15	I worry when I do not know what my group members are going to ask me.	0.83	0.07
PD 8	I find tasks that require my immediate response (answer) frightening.	0.61	0.07
IV 7	My performance on a task depends on the interviewer that I get.	0.40	0.08
IV2	I find tasks that require my response (answer) without preparation frightening.	0.37	0.08
IV1	Tasks that require me to respond (answer) immediately make me nervous.	0.32	0.08
IV3	I worry when I do not know what the interviewer is going to ask me.	0.16	0.08
PD12	My performance on a task depends on the peer that I get.	0.07	0.08
IV4	I perform well on tasks that give me time to prepare. (Individual)	0.00	0.08
PD11	I perform well on tasks that require me to interact with a peer.	-0.11	0.08
GD14	I like tasks where I am given time to prepare my response (answer) while the other group members take turns speaking.	-0.19	0.08
IV 6	Interacting with an interviewer I am familiar with makes me feel comfortable.	-0.20	0.08
PD10	I perform well on tasks that give me time to prepare. (Paired)	-0.34	0.08
GD17	I perform well when I interact with group members with whom I am familiar.	-0.40	0.08
GD13	Tasks that give me time to prepare my response (answer) make me feel comfortable and relaxed.	-0.46	0.08
GD19	Interacting with group members I am familiar with makes me feel more confident.	-0.50	0.08
GD18	Talking about familiar topics make me feel more confident.	-0.62	0.08
IV 5	Talking about familiar topics make me feel more confident.	-0.98	0.09

people or interacting without enough time or preparation, it is imperative to highlight that their confidence differed based on the context (i.e. individual task, paired or group discussions). Figure 3 shows the means and the hierarchy order of the items under each context. They mostly lacked confidence in interacting in pairs (Mean = 0.26), followed by individual interviews (0.01), and in groups (-.022). Having investigated the items under each category, it is noticeable that the participants were more confident in interacting on familiar topics, with familiar people and having enough time to prepare (Figure 3).

Psychometric Properties of Perceived Ability (Can-Do) Scale in English Oral Communication

A 10-item scale was used to measure the participants' perceived ability (Can-Do Statements) on their oral communication in the English language. The results in Table 5 indicated that the item reliability was high (0.91), with separation index (3.15) > 2; and the person ability reliability was also high (0.94) with person separation index (2.89) > 2. Moreover, all items had positive point-measure correlation coefficients, ranging from 0.77 to 0.88. It means that all items were working in the same direction to define

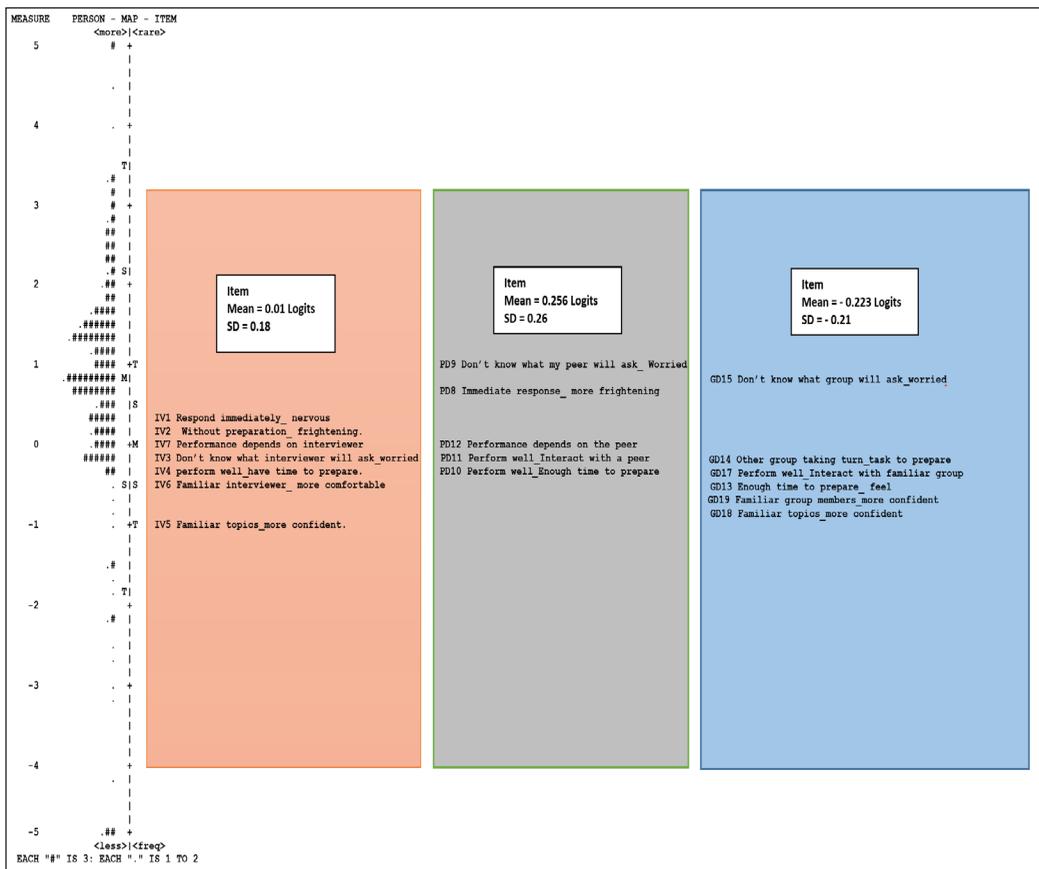


Figure 3. Person-Item Map (interview IV, paired discussion PD and group discussion GD)

the construct (i.e., perceived ability in oral communication in English). All items also had infit and outfit mean-square values within the recommended range (0.5 - 1.5), indicating meaningfully to the measured construct. Table 6 also shows the variance

explained by the measures was 66.8%, and the largest factor extracted from the residuals was equivalent to 2.00, which has a strength of about two items. Thus, it shows that the scale's unidimensionality was not violated.

Table 6
Reliability, separation item fit statistics and point-measure correlation coefficients (Can-Do statements)

No	Item	Infit		Outfit		PT-Measure CORR
		MNSQ	ZSTD	MNSQ	ZSTD	
DO1	I can take part effortlessly in any conversation or discussion.	1.28	3.1	1.33	3.6	0.80
DO2	I can have a good familiarity with idiomatic expressions and colloquialisms.	1.40	4.4	1.44	4.7	0.77
DO3	I can express myself fluently and spontaneously without much obvious searching for expressions.	1.06	0.7	1.05	0.6	0.84
DO4	If I do have a problem, I can restructure the conversation without stopping any interaction.	0.8	-2.5	0.82	-2.3	0.87
DO5	I can use language flexibly and effectively for social and professional purposes.	0.88	-1.5	0.86	-1.7	0.87
DO6	I can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers possible.	0.75	-3.3	0.74	-3.4	0.87
DO7	I can enter unprepared into conversation on topics that are familiar, of personal interest or pertinent to everyday life.	1.12	1.4	1.09	1.1	0.84
DO8	I can present clear, detailed descriptions on a wide range of subjects related to my field of interest.	1.06	0.7	1.04	0.5	0.85
DO9	I can explain a viewpoint on a topical issue giving the advantages and disadvantages of various options.	0.81	-2.4	0.8	-2.5	0.88
DO10	I can present a clear, smoothly-flowing description or argument in style appropriate to the context with an effective logical structure.	0.73	-3.6	0.73	-3.5	0.88
Means		0.99	-0.3	0.99	-0.3	
P.SD		0.22	2.6	0.23	2.7	
Item difficulty measure Reliability				0.91		
Item separation				3.15		
Person ability reliability				0.94		
Person separation				2.89		
Raw variance explained by measures				66.8%		
Unexplained variance in 1st contrast				2.00		

Perceived Ability in English Oral Communication

Overall, the participants were positive (not high) toward their oral interaction in English. The person ability means (0.31 logits) could be deduced, higher than the item difficulty mean (0.00 logits). However, the results in Table 7 and Figure 4 show that they could not interact fluently or spontaneously because they might have not enough vocabulary and expressions that helped them interact mainly in unfamiliar situations. Therefore, it was difficult for them to endorse the items at the upper part of the scale. On the other hand, they felt they could interact in familiar situations and on topics related to their social and professional settings.

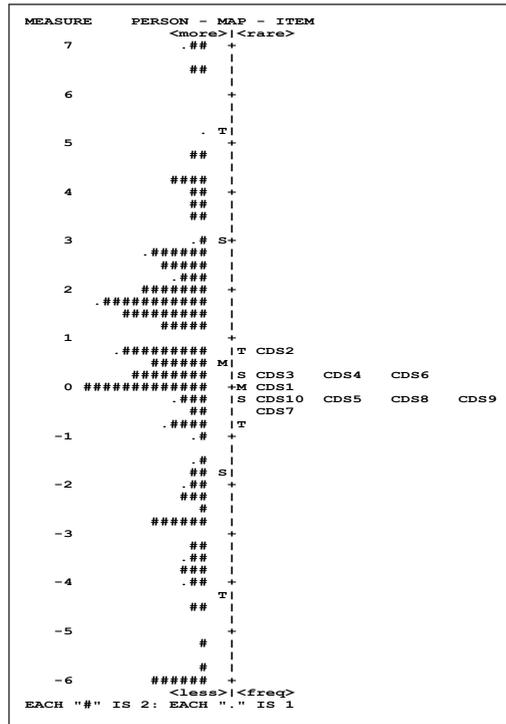


Figure 4. Person-Item Map (Can Do Statements) in English oral communication skills

Table 7
Item difficulty measures (Can Do statements)

No	Item	Difficulty Measures	S.E
DO 2	I can have a good familiarity with idiomatic expressions and colloquialisms.	0.70	0.1
DO4	If I do have a problem, I can restructure the conversation without stopping any interaction.	0.32	0.1
DO 3	I can express myself fluently and spontaneously without much obvious searching for expressions.	0.29	0.1
DO6	I can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers possible.	0.19	0.1
DO1	I can take part effortlessly in any conversation or discussion.	-0.03	0.1
DO10	I can present a clear, smoothly-flowing description or argument in style appropriate to the context with an effective logical structure.	-0.13	0.1
DO5	I can use language flexibly and effectively for social and professional purposes.	-0.15	0.1
DO8	I can present clear, detailed descriptions on a wide range of subjects related to my field of interest.	-0.3	0.1
DO9	I can explain a viewpoint on a topical issue giving the advantages and disadvantages of various options.	-0.37	0.1
DO7	I can enter unprepared into conversation on topics that are familiar, of personal interest or pertinent to everyday life.	-0.52	0.1

RESULTS OF INFERENCEAL ANALYSIS

The inferential analyses (One-way analysis of variance (ANOVA) and independent samples t-test) were conducted to identify the significant differences in mean scores of English-speaking anxiety, confidence, and perceived ability in English language oral communication with selected demographic variables (i.e., gender, academic year, university type/category and faculty). The results in Table 8 show no statistically significant differences in the mean scores of speaking anxiety, confidence, and perceived ability in English language oral communication for both students' academic year and gender, $p > .05$. In contrast, it shows a significant difference in speaking anxiety mean scores for university type/category (comprehensive and other two research universities), ($p < .05$). Post-hoc analysis using the Tukey test indicated that the students who came from research

university (A) had the highest level of speaking anxiety ($M = .8638$ logits), which significantly differed from the other two universities, comprehensive $M = .0441$ and research university (B) $M = -.0116$ logits, $p < 0.5$. Furthermore, the ANOVA results show a significant difference in students' confidence in speaking English mean scores across faculty (Science, Information and Technology, and Engineering), $p < .05$. Post-hoc analysis using Tukey test indicated that the students in Engineering and Information and Technology Faculties had higher significant difference from those in Science Faculty (1.04 logits, 1.03 logits and .208 logits respectively), $p < .05$. Finally, the same results were found for the perceived ability in English oral communication. The students in Engineering and Information and Technology Faculties had a higher significant difference from those in Science Faculty (1.013 logits, .688 logits and -.760 logits), $p < .05$.

Table 8
Results of *One-way analysis of variance (ANOVA) and Independent samples t-test*

Construct	Variable	N	Mean±SD (Logit)	p value
	Gender			
Anxiety	Male	116	-.0381±2.383	.055
	Female	184	.467±1.899	
	Academic Year			
	Third	140	.451±1.560	.156
	Fourth	160	.114±2.489	
	University Category			
	Comprehensive	110	.044±2.033	.006*
	Research A	90	.864±1.787	
	Research B	100	-.012±2.362	
	Faculty			
	Science	100	.411±1.224	.093
	Information & Technology	100	.503±1.504	
	Engineering	100	-.100±3.080	

Table 8 (continue)

Construct	Variable	N	Mean±SD (Logit)	p value
	Gender			
Confidence	Male	116	.537±1.743	.081
	Female	184	.896±1.768	
	Academic Year			
	Third	140	.675±1.618	.460
	Fourth	160	.826±1.885	
	University Category			
	Comprehensive	110	.489±2.006	.128
	Research A	90	.962±1.584	
	Research B	100	.862±1.607	
	Faculty			
	Science	100	.208±2.753	
	Information & Technology	100	1.03±.857	.001*
	Engineering	100	1.04±.788	
	Gender			
Can-Do Perceived ability	Male	116	.313±2.652	1.000
	Female	184	.314±3.186	
	Academic Year			
	Third	140	.144±2.859	0359
	Fourth	160	.462±3.094	
	University Category			
	Comprehensive	110	.527±3.037	.232
	Research A	90	.516±3.162	
	Research B	100	-.104±2.743	
	Faculty			
	Science	100	-.760±4.269	
	Information & Technology	100	.688±1.828	.000*
	Engineering	100	1.013±1.887	

* The mean difference is significant at the 0.05 level

DISCUSSION

This study suggests that, in general, the participants had experienced English language speaking anxiety that could affect their English oral communication that concurs with Salem and Al Dyyar (2014), who found a negative relationship between English speaking anxiety and speaking fluency. In addition, speaking anxiety adversely affects students' oral presentation and conversation with English

native speakers (Bux et al., 2015). As a result, the participants in this study mainly felt worried and anxious before they were asked to speak. They often lost their control before they delivered the speech in front of others. They prefer to talk about familiar topics and interact with familiar persons, and they need enough time to prepare for the communication. These findings show that the participants demonstrate situational anxiety since it appears in

specific situations (MacIntyre, 1999), for example, in unfamiliar contexts where the learners are required to use the language. This anxiety ends or reduces when learners become more familiar with the new context (Riasati, 2011). The participants also tend to think about others whom they believed to be better than them. It might be because most participants showed a lack of confidence in English oral communication during individual interviews, paired or group discussions (i.e. regardless of the context). Kamaruddin et al. (2019) found that low self-esteem and social anxiety contributed significantly to the level of both listening and speaking anxieties among Malaysian university students majoring in non-English programs. On the same note, Desmaliza and Septiani (2017) found a significant correlation between students' perceived ability and speaking skills, positively influencing students' performance in oral communication activities. In this study, the participants perceived that they could not interact fluently or spontaneously because they might not have enough vocabulary and expressions to help them interact mainly in unfamiliar situations.

The finding agrees with Amiri and Puteh (2018)'s study, which found that among the factors that caused anxiety to international postgraduate students in different Malaysian universities are inadequate linguistic competency and inadequate knowledge of the presentation's content. On the other hand, they perceived a higher ability to interact about familiar situations and topics related to their social and professional

settings. It is because they had enough vocabulary and expressions with which to interact. Sadighi and Dastpak (2017) found inadequate vocabulary knowledge as one of the main sources of speaking anxiety among students. Ahmed et al. (2017) found that the participants with insufficient linguistic competence led to speaking anxiety and affected their oral communication since they could not express themselves in a wide range of communicative situations. Zahiri et al. (2017) found that speaking anxiety and perceived ability affect students' monologue speaking skills. The former was found to have a negative effect on speaking performance, while a higher perception of their ability has made them better in speaking performance. Besides, lack of vocabulary and expressions result in the participants to have negative or low perception on their self-confidence. Stenstrom (2014) maintained that confidence is an important factor in spoken interaction as a two-way process. This idea was coined in Tsou (2005) who found that high self-confidence is positively correlated with oral performance as it determines the learners' willingness to communicate. Other researchers found the exact relationships between self-confidence and speaking competency (Gürler, 2015; Mandokhail, 2018; Tridinanti, 2018).

Though the surveyed participants showed a lack of confidence in oral communication on unfamiliar topics, interacting with unfamiliar people or interacting without enough time for prior preparation, they lacked confidence in interacting in pair, individual and group interviews. They

might feel more comfortable in groups as they took additional time to prepare, and the same applied when they were in individual interviewing. McDonough (2004) reported that learners improved their speaking skills when put in group and pair tasks. These findings are alarming as university students are expected to be able to communicate at the C1 level of the CEFR, where communication expectations are about the ability to smoothly engage in synchronous discourse involving a wide range of social, academic and professional topics without much searching and assistance (Council of Europe, 2018).

The independent samples t-test shows no significant differences in the mean scores of speaking anxiety, confidence in speaking English and perceived ability for gender and student academic year. However, the female students reported a higher mean score in speaking anxiety, as indicated by the mean differences. The female students might be more concerned about their appearance in front of others in the conversation, which might affect their confidence and ability in oral communication. Literature has reported different findings in terms of gender and ESL or EFL speaking anxiety. For instance, Batiha et al. (2016) found no significant differences in the mean scores of speaking anxiety in research conducted on the factors of speaking anxiety among EFL university learners due to gender. The same findings were reported by Ahmed et al. (2017), who conducted research to identify the factors responsible for ESL oral communication anxiety among postgraduate students in

Pakistan. Other studies reported that females scored higher levels of EFL speaking anxiety (Ahmed & Alansari, 2004), whereas Elaldi (2016) reported that male EFL University students had higher speaking anxiety levels than female students. It seems these variations depend on research contexts.

For confidence and perceived ability, the one-way ANOVA analysis indicated that engineering students were more confident and perceived higher ability in oral communication than their counterparts in science or information and technology faculties despite the type of university. This result indicated that undergraduate engineers might have realised the importance of English speaking skills in their future careers. Past studies found that many engineering graduates could not secure a job due to their inability to command good English (Kakepoto, 2013; Sheth, 2016; Ting et al., 2017). Over the years, research has focused on the significance of English for engineers at the workplace (Božić & Pintarić, 2018; Dewi et al., 2015; Hossain, 2013; Rajprasit & Hemchua, 2015; Spence & Liu, 2013). Sheth (2016) proclaims that engineering employers give priority to graduate engineers with competence in English speaking over their counterparts who tend to be highly tech-savvy but with a low level of English language speaking skills. As for Science undergraduate students, there is a need to improve awareness about the importance attached to the English language in their future profession. It would motivate them towards enhancing their competence in spoken English.

CONCLUSIONS AND IMPLICATIONS

This study mainly aimed to analyse speaking anxiety, confidence and perceived ability in English oral communication among Science and Technology undergraduates in comprehensive and research universities in Malaysia. Furthermore, it aimed to find the significant differences in the three sub-constructs based on the selected demographic variables. Overall, the participants experienced speaking anxiety, low confidence, and yet high-perceived ability in English oral communication, with significant differences in mean scores of English speaking anxiety across university category and confidence and perceived ability due to students' specialisation (i.e., science, technology and information and engineering). However, engineering students were more confident and could perform better in oral communication than their science or information and technology faculties counterparts. In addition, the findings show that the participants felt more confident and more able in familiar situations, communicating on familiar topics to familiar audiences, contrary to the expectations for the C1 level in the CEFR.

The students enrolled in science, engineering and technology programmes need more training on English oral communication. Lecturers need to encourage students to practice oral communication in English in front of the class to improve their self-confidence and mitigate their anxiety. Furthermore, the topics should be

varied in familiarity and content to prepare them for future careers. In other words, they should be provided with authentic situations to practice and improve their levels in English oral communication. Besides, students should be encouraged to do oral presentations individually, in pairs and groups, reflecting the real discourse they are expected to engage in as they enter the working world. Furthermore, the university should provide students with training modules on enhancing their confidence and perceived ability as these factors play a substantial role in students' level of English oral communication. Contextually, the programs could also be geared towards more social-like situations and the classroom setting so that undergraduates can make English a social practice. As a result, students will be more qualified for future employability.

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