

## **Engineering students' beliefs about foreign language learning and school career**

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This mixed-methods inquiry begins with the supposition that students' choice of tertiary subject area and their former school experience might attract those with similar individual traits, including beliefs about second language (L2) learning. This study aims to explore the latent factorial structure of language learning beliefs of 253 engineering students in Japan, using Sakui and Gaies' *Beliefs about Language Learning Questionnaire* (Sakui & Gaies, 1999). The students' beliefs were organized into a five-factor structure and differed according to their school career. The results were different from earlier studies that involved non-engineering undergraduates in Japan and suggest that the organization of these engineering majors' L2 learning beliefs differs significantly from that of non-engineering majors. However, a qualitative interview revealed that two individuals from within the same university discipline can have contrasting learning beliefs. The findings suggest that it is necessary to raise foreign language teachers' awareness of the ways in which L2 learning beliefs can influence students' learning behaviours and preferred learning styles.

**Keywords:** beliefs; preferred learning styles; Japanese English language learners; engineering majors; university English

### **Introduction**

As with other learner characteristics, such as motivation and learning styles, much attention has been focused on the beliefs of second language (L2) learners, that is, "the general assumptions that students hold about themselves as learners, about factors influencing language learning, and about the nature of language learning and teaching" (Victori & Lockart, 1995, p. 224). Given that L2 learning beliefs are relevant to understanding learner "expectations of, commitment to, success in, and satisfaction with" a learning environment (Horwitz, 1988, p. 283), they are thought to be among the vital factors that account for the experiences and outcomes of individuals' language learning (Kalaja & Barcelos, 2013). L2 learning beliefs can indicate the decisions learners make (McDonough, 1995) and may influence the ways they approach the challenge of learning a language (Kalaja, Barcelos, & Aro, 2018). In the increasingly skill-focused mode of English language learning promoted in the education sector in Japan (see Kubota, 2015), such as task-based teaching (Willis & Willis, 2007), the active role is handed over to learners. The extended discretion bestowed on learners with regard to how they should approach learning means they have more freedom to negotiate their learning approach. In increasingly flexible circumstances, some limiting beliefs may exercise an inhibiting

effect on learner perception and behaviour and, consequently, may limit the path to successful learning, which involves change, such as “stretching” of the learning style (Griffiths & İnceçay, 2016; Ma & Oxford, 2014). Hence, learner expectations, experience, and understanding of the optimal form and content of language learning have come under greater scrutiny (Abe, 2013).

According to the literature (see, for example, Benson & Lor, 1999; Bernat & Lloyd, 2007; White, 1999), research on how students perceive and approach foreign language learning across different contexts is essential for constructing an informed pedagogic practice. As learner expectations of the learning context are rooted in beliefs that are informed by national belonging, as well as in previous experience (Horwitz, 1987), many studies have focused on the linkage between beliefs and cultural membership (De Costa, 2011; Horwitz, 1999; Pan & Block, 2011), and between beliefs and instructional approaches or new learning environments (Amuzie & Winke, 2009; Johnson, 1994; Loewen et al., 2009). However, few studies narrow the focus to specific university disciplines, thus, there is insufficient evidence clarifying the linkage between the precursors of students’ disciplinary choices and their conceptions of the aims and means of language learning (Trinder, 2013). The present study investigates whether the antecedents that form students’ choice of university discipline might intervene in language learning in Japanese higher education.

### **Literature review**

The literature states that L2 learners’ beliefs are inherently multifaceted constructs and intricately informed by both internal and external factors (Bernat & Gvozdenko, 2005). Consequently, the degree of emphasis placed upon either the internal or the external factors is subject to the research epistemology of each study. While the positivist approach addresses L2 learners’ beliefs as mental representations, the recent contextual approach stresses the linkage between individual learners and the institutional structures they interact with, such as the learning context and their communities (Barcelos, 2003; Kalaja & Barcelos, 2013; Kalaja et al., 2018). Positivism treats L2 learners’ beliefs as cognitive representations that can be elicited through a psychometric survey (for example, Horwitz, 1987) and is suited to mapping beliefs in and of themselves. While evidence abounds concerning learners’ beliefs about learning and teaching, more research in different areas is ongoing (see Kalaja et al., 2018). These areas include a focus on how beliefs are constructed by a learner while influenced by other people and social artefacts. As such, the contextual approach highlights L2 learners’ emic perspective, which views beliefs as idiosyncratic, context-specific, and hence, transient phenomena (for example, Riley, 2009; Sakui & Gaies, 1999). From this perspective, L2 learners construct their beliefs in relation to the social environment in which they have been nurtured.

In the higher education setting in Japan, most L2 learning belief studies operate from the positivist perspective (Keim, Furuya, Doye, & Carlson, 1996; Riley, 2006, 2009; Sakui & Gaies, 1999; Yonesaka, 2008; Yonesaka & Tanaka, 2013). In a seminal study, Sakui and Gaies (1999) examined the consistency of the responses of approximately 1,300 Japanese university students from multiple universities in their L2 learning belief survey and conducted a four-factor analysis of the students’ beliefs. Their survey has been recognized in Japanese higher education as a definitive instrument, and it has been used in multiple studies, all of which involved English-major university students (Keim et al., 1996; Riley, 2006, 2009; Yonesaka, 2008; Yonesaka & Tanaka, 2013). The use of this common survey format has enabled comparisons across these studies which have shown

that English-major university students in Japan share a common L2 learning belief structure (Riley, 2006, 2009; Yonesaka, 2008; Yonesaka & Tanaka, 2013).

This paper reports on Japanese engineering students' beliefs about learning English, focusing on a discipline-specific tertiary setting. The overarching goal of the study is to identify the structure of tertiary students' beliefs about language learning in an engineering education setting, as opposed to non-engineering disciplines. Further, the study seeks to understand possible variation in the conceptions of language learning between engineering students who previously studied in academic high schools and those who studied in vocational high schools. With the supposition that the problem-solving, practical nature of engineering might attract common individual traits, the following questions guide this inquiry:

1. What beliefs do the engineering students have about English learning, and how can their beliefs be explained?
2. Are there any differences in the students' beliefs according to the secondary education they received?

### **Method**

The study employed a mixed-methods design, which involved quantitative data as its main component. The quantitative study was complemented with a narrative analysis of qualitative interview data, as detailed in the following sections.

### ***Context and participants***

The study was conducted at a small regional university in northern Japan with a student population of 1,137 at the time when the study was conducted. Undergraduates were required to study general English as a foreign language (EFL) courses during their first two semesters which consisted of two 90-minute classes per week. The approach and course contents adopted by the English department emphasized knowledge of receptive skills (grammar, reading, and listening) rather than productive skills (writing and speaking), in large part due to contextual factors, such as a large student/teacher ratio and the positioning of the courses as remedial education. A total of 253 students (22.3% of the student body) agreed to participate in the study. They were enrolled in the first-year compulsory EFL courses or had completed them in previous years. As Table 1 shows, participants were predominantly male (83.0%) and this is consistent with the student population of the institution (86% male and 14% female) at the time of the survey being conducted. The majority of participants were first-year students (58.9%). Those participants who were vocational high school graduates had studied a range of majors in their secondary schools which included commerce, agriculture, science, and mechanical engineering.

### ***Instrument and procedure***

The study used the Sakui-Gaies' *Beliefs about Language Learning Questionnaire* (Sakui & Gaies, 1999), along with narrative interview data. Consistent with Sakui and Gaies (1999), the following points were considered in deciding whether to use this instrument: (1) the need for a context-specific questionnaire, which taps into dispositions relevant to a higher-education setting in Japan; (2) the availability of an instrument to which informants could respond in Japanese; and (3) context-sensitivity informed by local professionals' observations and experience as well as the literature. One of the possible limitations of this instrument was its inability to track the dynamic dimension of L2

learning beliefs, as highlighted in the contextual approach. However, the research problem must be the primary consideration when selecting one approach from among several approaches (see Creswell, 2018). The instrument was chosen as one of the more readily available and relevant methodological options, since the aim was to discover any differences in L2 learning beliefs between these engineering and those arts students about which evidence had already been accumulated and discussed in the literature mentioned above. While it is an old instrument, it remains contextually valid. The Japanese Ministry of Education has devised broad standards for all schools, placing an emphasis on the development of communicative skills. Although we do not wish to preclude the possibility of comparison with a contextual approach, we argue that by using this positivist approach as the major component of the study, a more straightforward comparison can be made with earlier studies conducted with a common epistemological vision. Further, the study is supplemented with qualitative interview data, as will be explained below.

Table 1. Demographic information of sample

Independent variables	Group	Number	Percentage (%)
Gender	Male	210	83.0
	Female	43	17.0
Study year	First	149	58.9
	Second	45	17.8
	Third	28	11.1
	Fourth	31	12.3
Past secondary education	Academic	144	56.9
	Vocational	109	43.1

The survey contained 45 items and utilized a four-point Likert scale for all the items, where 1 represented *strongly disagree* and 4 represented *strongly agree*. The items were presented in random order in an online format. A set of items at the end of the survey asked for the participants' demographic information, including their year, the area of study, and previous educational experience. The authors sent the survey via email to all the students enrolled at the university, with detailed information about the rationale of the study, assurances with regard to the participants' anonymity and privacy, and an estimate of the time required to complete the online questionnaire. The participants, who were informed that they could withdraw without any explanation or consequence, entered their responses online outside of class time, using computers or mobile devices. The data entry period spanned two months.

The completed questionnaires were computer-coded, and the data were screened and analyzed using IBM SPSS 22.0. Exploratory factor analysis was used as a statistical means for exploring and reducing the dataset (see Costello & Osborne, 2005). The data were subjected to tests of normality and skewness (see Appendix 1). A graphical inspection of the data indicated that the distributions for most items were bell-shaped, and the skewness values (between  $-.98$  and  $+.67$ ) and kurtosis (between  $-.68$  and  $+2.60$ ) for all items indicated no unfavourable deviations from normality (Lomax & Hahs-Vaughn, 2012). The literature states that the principal factors method used in this study requires

no distributional assumptions (MacCallum, 2009). Thus, we used the principal axis factoring method, with a threshold of .35 for factor loadings, considering the study's sample size of 253 (Hair, Black, Babin, & Anderson, 2009). Prior to the factor analysis, the factorability of the data was confirmed. The Kaiser-Meyer-Olkin (KMO) value was .744, exceeding the recommended threshold of .6 (Kaiser, 1974). Moreover, Bartlett's Test of Sphericity displayed statistical significance ( $p = .000$ ), supporting the factorability of the correlation matrix. The factor solution was sought via scree plots and the number of factors with eigenvalues greater than 1 and with loadings whose absolute value was higher than .35 (Hair et al., 2009); in doing so, the interpretability of the solution was carefully considered.

Following the factor analysis, the frequencies and means were computed to analyse the items explained by the extracted latent factors. To assess whether there were significant educational background differences in the informants' beliefs and perceptions we used independent-samples *t*-tests which are considered a reasonably robust procedure (Sheskin, 2007) to determine whether the difference regarding language learning beliefs between the two educational background groups is significant.

### ***Interview data and analysis***

An interview was organised with two male engineering students from among those who returned the survey. The same ethics protocol was applied as with the quantitative survey, including the right to withdraw from the research. One student had attended an academic high school, and the other had attended a vocational one. An interview schedule (Appendix 2) was used, but participants were also allowed room to jointly construct narratives of their L2 learning. Interviews were conducted in Japanese, recorded on a digital audio device, and transcribed for analysis. For this article, participants' words are translated into English, and they appear under the pseudonyms Shota and Shun, two common Japanese names, so that their real identities remain anonymous. The data were analyzed using a variation of the narrative analysis approach (Murray, 2009; Sakui & Cowie, 2008), which involved multiple readings of the transcripts followed by configuration of the interview accounts into two small stories about foreign language learning.

## **Results**

### ***Descriptive statistics***

Descriptive statistics for the 45 items in the instrument were computed (Appendix 1). The items that were rated most highly ( $M > 3.2$ ) consisted of a range of beliefs. These included the belief that language learning requires considerable effort ( $M = 3.40$ ) and that there are gradient levels of difficulty in learning different foreign languages ( $M = 3.33$ ). Those items that were rated the lowest ( $M < 2.1$ ) also concerned varying beliefs. These included the belief that there was an association between being female and having a better aptitude for language learning ( $M = 2.06$ ) and a belief about the ability of the Japanese in learning a foreign language ( $M = 2.04$ ).

### ***Factor structure***

A factor analysis of the 45 items was performed using the principal axis factoring method with Promax rotation. An initial analysis was run to observe eigenvalues for each factor in the data. Based on the minimum eigenvalue of 1 and a threshold of .35 for factor

loadings (Hair et al., 2009), six cross-loaded items (1, 4, 5, 16, 27, 31) were culled. The same procedure was iterated four more times, and 18 items were dropped. The remaining 21 items yielded a five-factor solution accounting for 53.0% of the total variance, with KMO = .734; Bartlett's Test of Sphericity reached statistical significance ( $p = .000$ ), indicating a robust factor analysis (Bartlett, 1954).

Table 2 shows the factor loadings after rotation, along with the reliability coefficient for each factor; these ranged from .445 to .740. The six items that clustered on Factor 1 accounted for 17.5% of the common variance. These items reflected the students' hopes that may emerge in their language learning, such as "I would go up to that person to practice speaking" and "English class should be enjoyable." We labelled this factor *orientation to communicative language learning* because these items reflect the view that English is important in getting meaning across to an interlocutor in an interactive situation. Factor 2, which accounted for 12.6% of the common variance, included four items that related to the grammar-translation language learning method; therefore, we labelled this factor *orientation to the grammar-translation method* (this was named in previous studies as orientation toward traditional language learning; see, for example, Sakui & Gaies, 1999). Factor 3, which accounted for 8.9% of the common variance, included five items; these items indicated a variety of anecdotes and hearsay evidence about language learning and, thus, Factor 3 was named *beliefs about language-learning aptitude and difficulty*.

Table 2. Factor-loadings for factor analysis\* with promax rotation of language-learning beliefs items

Items	<i>M</i>	<i>SD</i>	Loadings				
			F1	F2	F3	F4	F5
Factor 1: Orientation to communicative language learning ( $\alpha = .457$ )	2.67	0.40					
44 If I heard a foreigner of my age speaking English, I would go up to that person to practice speaking.	2.59	0.83	.710				
40 I study English because it is useful to communicate with English-speaking people.	2.94	0.79	.630				
17 If I learn to speak English very well, I will have many opportunities to use it.	3.21	0.73	.550				
4 I believe that someday I will speak English very well.	2.13	0.81	.523				
2 English conversation class should be enjoyable.	3.23	0.62	.485				
8 In English classes, I prefer to have my teacher provide explanations in Japanese.	3.01	0.68	-.373				
Factor 2: Orientation to grammar-translation method ( $\alpha = .740$ )	2.74	0.56					
32 Learning a word means learning the Japanese translation.	2.86	0.71		.749			

41	To understand English, it must be translated into Japanese.	2.78	0.74		.734
20	Learning English is, for the most part, a matter of translating from Japanese.	2.42	0.81		.630
36	To say something in English, I think of how I would say it in Japanese and then translate it into English.	2.89	0.73		.568
Factor 3: Beliefs about language-learning aptitude and difficulty ( $\alpha = .626$ )		2.71	0.51		
26	The Japanese are good at learning foreign languages.	2.04	0.76		-.670
25	People who speak more than one language well are very intelligent.	2.33	0.89		.522
30	Some people are born with a special ability that is useful for learning English.	2.38	0.83		.518
39	If my teacher is a native speaker, he/she should be able to speak Japanese when necessary.	2.82	0.74		.500
21	If I learn to speak English very well, it will help me get a good job.	3.09	0.81	.449	.490
Factor 4: Beliefs about the effort needed for language learning ( $\alpha = .533$ )		1.77	0.45		
27	In order to speak and understand English very well, English education at school is enough.	1.75	0.60		.639
3	In order to learn to read and write English very well, English education at school is enough.	1.95	0.71		.522
11	To learn English, it is important to repeat and practice a lot.	3.40	0.57		-.500
Factor 5: Beliefs about the nature and quality of language education ( $\alpha = .445$ )		2.43	0.51		
19	Learning English is different from other subjects.	2.93	0.70		-.504
43	The longer I study English, the more enjoyable I find it.	2.86	0.79		.479
45	I am satisfied with the English education I have received.	2.37	0.75		.424

Notes:

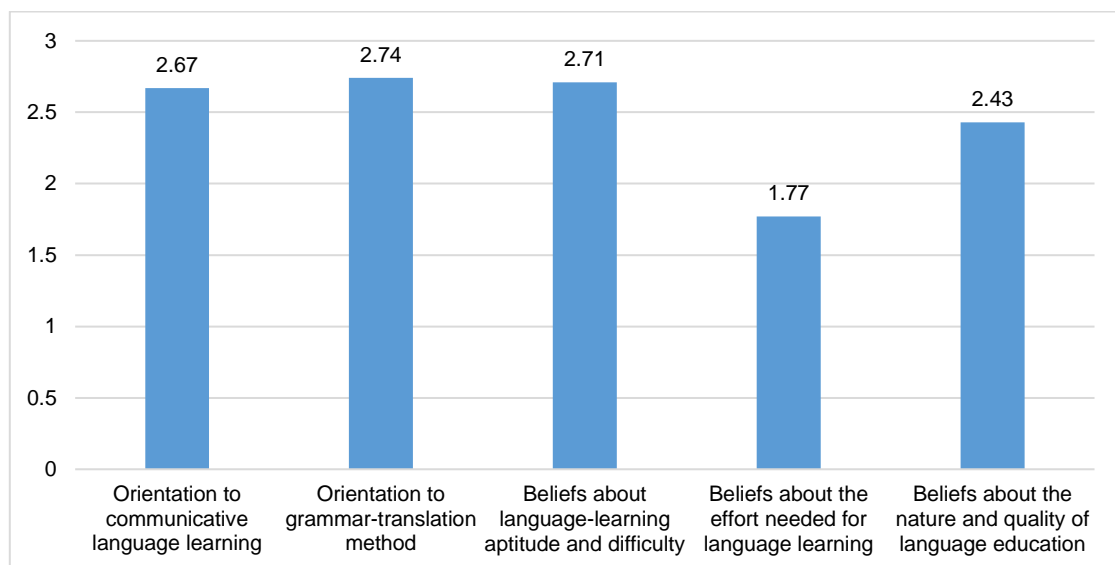
Percentage variance explained: total variance, 52.98; F1, 17.50; F2, 12.59; F3, 8.88; F4, 7.31; F5, 6.70. The negatively keyed items (8, 11, 19, 26) were reverse-scored, and the composite mean values were computed for each factor.

\* Principal axis factoring method.

Factor 4 included three items, accounting for 7.3% of the total variance. This factor was labelled *beliefs about the effort needed for language learning* because the items dealt with how much time and effort for language learning one would need to be able to function in a foreign language. Factor 5 was labelled *beliefs about the nature and quality*

of language education, indicating students' perceptions about the language education they had experienced. The proportion of variance this factor accounted for was 6.7%. Factors 4 and 5 were measured by only three items each, but they were retained as independent components for purposes of interpretation; both pairs of items loaded on each component in a conceptually meaningful way. Furthermore, inspection of scree plots revealed a clear break after Factor 5, and these five factors met the Kaiser  $> 1$  criterion (Kaiser, 1960).

In sum, five factors were extracted from the 21 items. These factors together can be understood as capturing beliefs about language learning among the participants. The mean values of the five factors were greater than the midpoint of 2.5 using the 4-point Likert scale, except for beliefs about the effort needed for language learning (Figure 1).



Note: Participants chose one from a set of response options using a four-point scale concerning language learning, from 1 = "strongly disagree" to 4 = "strongly agree."

Figure 1. Latent factors influencing language-learning beliefs with mean values.

### ***School career***

There were significant differences ( $p < .01$ ) between the academic and vocational school graduates in the number of lessons per week they had received (Table 3) as well as orientation to communicative language learning scores ( $p < .05$ ), but not with the other orientations and beliefs (Table 4). These results confirm that academic school graduates spent a greater amount of time learning English in high school, with an effect size value of 1.32, which suggests a very large significance. It was also shown that vocational school graduates had higher communicative orientation scores, but no statistical difference existed between academic and vocational school graduates in terms of the other four factors. Furthermore, the effect size value ( $d = .28$ ) showed medium practical significance which suggests that vocational school graduates had stronger beliefs in the value of communicative language learning.



Table 3. *t*-test results comparing academic and vocational school graduates on the number of lessons per week in high school

	Academic			Vocational			<i>df</i>	<i>t</i>	<i>p</i>	95% CI		Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>				<i>LL</i>	<i>UL</i>	
Number of lessons per week	4.48	1.83	139	2.37	1.32	106	242.2	10.5	.000	1.71	2.50	1.32

Notes: CI, confidence interval; *LL*, lower limit; *UL*, upper limit.

Table 4. *t*-test results comparing academic and vocational school graduates on language learning orientation and beliefs

	Academic			Vocational			<i>df</i>	<i>t</i>	<i>p</i>	95% CI		Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>				<i>LL</i>	<i>UL</i>	
Orientation to CLL	2.62	0.41	144	2.73	0.37	109	251	-2.06	0.04*	-0.20	0.00	0.28
Orientation to GTM	2.72	0.53	144	2.75	0.60	109	251	-0.43	0.67	-0.17	0.11	0.05
Aptitude and difficulty	2.68	0.54	144	2.76	0.47	109	251	-1.27	0.21	-0.21	0.05	0.16
Effort in language learning	1.75	0.45	144	1.80	0.46	109	251	-0.88	0.38	-0.16	0.06	0.11
Nature and quality	2.44	0.51	144	2.43	0.52	109	251	0.19	0.85	-0.12	0.14	0.02

Notes:

CI, confidence interval; *LL*, lower limit; *UL*, upper limit; CLL, communicative language learning; GTM, grammar-translation method.

\**p* < .05.

## Interviews

The transcripts of the two interviews were used to configure interviewees' narratives. The interview schedule had a chronological order, enabling the piecing together of accounts using the interviewees' own words. However, some texts had to be altered for cohesion; this happened, for example, when interviewees' comments referred to a previous question. In such cases, the sense of the text was retained. From these reconstructed accounts, a common theme emerged that English language learning was intertwined with the real world that the interviewees inhabited. That is, the participants did not see English as an object of study in its own right. Rather, the language was a means to an end (experiencing and living in the real world that surrounded them).

Shota's narrative:

My story starts at Kumon<sup>1</sup> when I was in elementary school. My parents kept hammering away at me that English would be very important to me. I went to the cram school until I was in grade nine. In high school, my classroom teacher recommended that I take an Eiken<sup>2</sup> test. Eiken was a

strong reason I studied English then. I kept studying through to the university entrance exams. I studied English the most among all the subjects I took in high school. But now, I don't spend as much effort or time studying any subject—not just English. To me, English was important, but I no longer have any goal at the moment.

Shun's narrative:

I hardly studied English before coming to the university. My only contact with the language in the classroom was in high school, and we only listened to some English songs in the classroom and sang them. Other than that, I only remember that I had to memorize some vocabulary as I was told to do so. So, I had a hard time adjusting to the English lessons at the university. But I've somehow managed so far. I looked up every single word I didn't know in the dictionary. Gradually I took to reading easy reading books, what they call "extensive reading" books. I picked up new words and grammar points as I read these books. But I often skip passages that I don't understand. It's okay; I still can make out the storyline myself. At the end of my first year at the university, I had a chance to visit Australia. I learned that speaking English is nothing, nothing special at all, as everyone speaks it there. It's like I don't study English; I use it with friends overseas on SNS, such as LINE and Facebook. It's not about studying.

## Discussion

This study explored beliefs about language learning in an engineering education setting so as to contribute to the ongoing discussion of the context-specificity of belief formation regarding L2 learning (see, for example, Trinder, 2013). The investigation set out with the presumption that the problem-solving, practical nature of a degree in engineering studies might attract common individual, metacognitive traits, as reflected in undergraduates' beliefs about L2 learning. The results of the survey appear to support the hypothesis that the majority of the engineering students in this study share certain conceptions about language learning. The narrative analysis of the qualitative interview also helped reveal conceptions about foreign language learning that were held by the students, indicating a school career-derived difference.

First, the five-factor structure, in contrast to the four-factor structure detected among the arts and humanities majors in Japan (Riley, 2006, 2009; Yonesaka, 2008; Yonesaka & Tanaka, 2013), reveals a perceptual pattern unique to these engineering students that is highly consistent across the participants, indicating that most of the engineering students perceive the degree of effort required toward mastering a foreign language to be an issue. The means of the items indicate that many participants perceived that they needed more time (Items 3 and 27) and practice (Item 11) outside of regular class time to master a foreign language. The existence of this factor suggests that many of the engineering students perceived the difficulty of language learning differently from non-engineering students.

Further, the quantitative survey revealed that those participants who had previously attended vocational high schools showed a greater orientation to communicative language learning than those who had been in academic schools. This finding also appears to mirror the supposition that the experiences that students underwent through the high school curricula and school culture might have a bearing on the formation of L2 learning beliefs that highlight the communicative utility of a foreign language. The narratives of the interview participants seem to echo this supposition. For Shota, who had attended an academic high school, the purpose of learning English was to achieve high scores in a language test and in university entrance exams; this was encouraged by his teachers and endorsed in the school culture he inhabited. However, at the university, there no longer seems to be any motivation for him to sustain his learning of English. For Shun, in contrast, the purpose of reading books and using social media with foreign friends is to provide pleasure from reading and socializing, rather than to acquire vocabulary and

grammar. Therefore, the motivation for his learning behaviour endures as long as he remains willing to connect online with overseas friends. These two participants' narratives only reveal that two individuals in the same discipline at the same university may have starkly contrasting orientations toward learning a foreign language.

The implications of the narrative analysis cannot be extrapolated from a small sample to a large population. However, the students' communicative orientation to foreign language learning, as well as the differences between the academic and vocational school graduates, as gleaned from the quantitative and qualitative components of the study, suggest several important points. Heightened awareness of the ways in which individual learners' orientations and convictions can influence their learning behaviour may assist teachers to enhance their students' learning. Given that the gaps between instructional approaches and individuals' metacognitive styles may have negative implications, instructors and curriculum writers ought to approach these mismatches proactively. At a micro level, teachers could accommodate different learner styles and strategies (Griffiths & İnceçay, 2016; Ma & Oxford, 2014), informed by students' individual beliefs about L2 learning, even though they would be unable to tailor instruction to the individual beliefs of every learner (Horwitz, 1999). If a group of engineering students in a classroom prefers a tactile and kinaesthetic mode of language learning, the teaching staff can support such students by providing an activity enabling the students to develop their weaker skills, such as writing and reading, while matching these with their preferred learning style. Additionally, teachers can encourage individuals to stretch their learning styles and to tackle the challenge of discipline-specific English lessons at a university by drawing on regular in-class discussions about their misplaced beliefs and the appropriate strategies for approaching their language learning goals (Trinder, 2013).

## **Conclusion**

This study investigated the beliefs about L2 learning of engineering students at a small university in Japan. The results indicate that the orientation of the engineering students' beliefs concerning L2 learning differs noticeably from that of arts majors, most notably in their perceptions of the effort required. The narrative analysis indicated that two individuals in the same university discipline may have starkly contrasting learning beliefs; hence, the effectiveness of learning support might be enhanced with an increased awareness of the ways in which different individual orientations can influence students' learning behaviour and preferred learning styles. Some limitations of the study indicate directions for future research and refinements. This study was conducted with Japanese EFL learners in a rural setting. Results might vary according to the setting and the linguistic and cultural backgrounds of the learners. Further, because this study was cross-sectional, it offers a snapshot of the engineering students' beliefs concerning L2 learning. Longitudinal studies may provide insight regarding the complex and dynamic interplay of learner variables and fluctuations in students' beliefs and orientations.

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## **Notes**

1. Kumon is an educational network that runs popular cram schools in Japan.
2. The EIKEN Test in Practical English Proficiency is an English language test run by the Eiken Foundation of Japan, an incorporated Japanese public-interest foundation, in cooperation with the Japanese Ministry of Education.

### About the authors

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### Appendix 1. Descriptive Statistics for Sakui and Gaies's Language-Learning Beliefs Questionnaire Items

Factor	Item		Mean	SD	Skewness	Kurtosis
4	11	To learn English, it is important to repeat and practice a lot.	3.40	0.57	-0.41	0.05
	28	Some languages are easier to learn than others.	3.33	0.69	-0.98	1.35
1	2	English conversation class should be enjoyable.	3.23	0.62	-0.29	-0.07
1	17	If I learn to speak English very well, I will have many opportunities to use it.	3.21	0.73	-0.54	-0.33
	15	Listening to tapes and watching English programs on television are very important in learning English.	3.15	0.60	-0.30	0.63
	23	People who are good at math and science are not good at learning foreign languages.	3.09	0.68	-0.35	-0.05
	5	It is useful to know about English-speaking countries in order to speak English.	3.09	0.66	-0.52	0.86
3	21	If I learn to speak English very well, it will help me get a good job.	3.09	0.81	-0.62	-0.10
	1	It is easier for children than adults to learn English.	3.08	0.71	-0.53	0.40
	9	It is OK to guess if you do not know a word in English.	3.02	0.62	-0.90	2.60
1	8	In English classes, I prefer to have my teacher provide explanations in Japanese.	3.01	0.68	-0.70	1.26
	13	If you are allowed to make mistakes in the beginning, it will be hard to get rid of them later on.	2.96	0.72	-0.46	0.29
	24	Japanese think it is important to speak English.	2.94	0.84	-0.61	-0.04
1	40	I study English because it is useful to communicate with English-speaking people.	2.94	0.79	-0.37	-0.33
5	19	Learning English is different from other subjects.	2.93	0.70	-0.40	0.30
	22	It is easier to read and write English than speak and understand it.	2.89	0.77	-0.32	-0.25
2	36	To say something in English, I think of how I would say it in Japanese and then translate it into English.	2.89	0.73	-0.50	0.37
2	32	Learning a word means learning the Japanese translation.	2.86	0.71	-0.45	0.35
5	43	The longer I study English, the more enjoyable I find it.	2.86	0.79	-0.36	-0.23
	35	I make mistakes because I do not study enough.	2.82	0.75	-0.47	0.15
3	39	If my teacher is a native speaker, he/she should be able to speak Japanese when necessary.	2.82	0.74	-0.51	0.27
2	41	To understand English, it must be translated into Japanese.	2.78	0.74	-0.57	0.37
	31	Speaking and listening to English is more useful than reading and writing English.	2.75	0.75	-0.74	0.50

	12	I would feel embarrassed to speak English in front of other Japanese students.	2.74	0.81	0.00	-0.68
	34	I can improve my English by speaking English with my classmates.	2.74	0.76	-0.50	0.13
	18	It is easier to speak English than to understand it.	2.71	0.81	-0.15	-0.47
	14	Learning English is, for the most part, a matter of grammar rules.	2.65	0.76	-0.44	-0.06
	37	I should be able to learn everything I am taught.	2.64	0.81	-0.18	-0.41
1	44	If I heard a foreigner of my age speaking English, I would go up to that person to practice speaking.	2.59	0.83	-0.06	-0.55
	10	If a person studies English by himself for 1 hour a day, he will be fluent in English in 5 years.	2.45	0.87	0.02	-0.65
	33	I am studying (studied) English only to pass the entrance examination.	2.43	0.88	0.08	-0.68
2	20	Learning English is, for the most part, a matter of translating from Japanese.	2.42	0.81	0.07	-0.47
	29	You can learn to improve your English only from native speakers of English.	2.42	0.71	0.14	-0.18
3	30	Some people are born with a special ability, which is useful for learning English.	2.38	0.83	0.05	-0.55
5	45	I am satisfied with the English education I received.	2.37	0.75	-0.14	-0.46
3	25	People who speak more than one language well are very intelligent.	2.33	0.89	0.29	-0.61
	7	Considering the amount of time I have studied English, I am satisfied with my progress.	2.32	0.78	0.04	-0.44
	38	I want my teacher to correct all my mistakes.	2.23	0.63	0.42	0.49
	42	It is easier for someone who already speaks a foreign language to learn another one.	2.17	0.70	0.23	-0.04
1	4	I believe that someday I will speak English very well.	2.13	0.81	0.63	0.21
	16	Girls are better than boys at learning English.	2.06	0.81	0.67	0.27
3	26	Japanese are good at learning foreign languages.	2.04	0.76	0.32	-0.32
4	3	In order to learn to read and write English very well, English education at school is enough.	1.95	0.71	0.48	0.31
	6	You should not say anything in English until you can speak it correctly.	1.93	0.71	0.50	0.27
4	27	In order to speak and understand English very well, English education at school is enough.	1.75	0.60	0.39	0.59

Factors on which item loads at 0.35 or larger. Scores range between 1 and 4: 1, strongly disagree; 2, disagree; 3, agree; 4, strongly agree.  $n = 253$ . The negatively keyed items (8, 11, 19, 26) were reverse-scored.

## **Appendix 2. Interview Schedule**

1. When was the first time you were exposed to English? Where did it happen? What was your reaction like?
2. How did you learn English in the past? Did you use any specific strategies? Was there any change in effort? What were the factors that induced that change?
3. How are you learning English now at the university? How much time do you spend learning English compared to engineering subjects?
4. How would you describe your motivation to learn English? How is it important in relation to other matters, such as other subjects and socializing with friends?
5. What do you do when you don't feel like studying English? Do you use any strategies to motivate yourself?