Implementation of an English Self-Study Package for English Language Development of Electronics Engineering Staff in the Workplace

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Abstract

This mixed-method research aims to: 1) examine the effectiveness of an English self-study package for engineering staff, and 2) investigate learners' opinions and personal learning experience with regards to the English self-study package. There were 20 participants, all of whom worked at electronics companies in Thailand selected by convenience sampling. A Pre-test and a post-test were employed. A questionnaire was used to examine the learners' satisfaction. Four case studies were proposed to shed light on differences occurring with regard to learners' use of the self-study package. The statistics used for quantitative analysis included percentage, mean, standard deviation and t-test, whereas qualitative analysis was content analysis. It was found that the post-test scores were significantly higher than the pre-test ones, with a high level of the overall satisfaction regarding unit contents, media production techniques and efficiency of lessons. The four case studies revealed that the efficiency of the package depends largely on individual differences in learners which can be identified as a 'Strongly determined learner', a 'Relaxed learner', a 'Digital-literate learner', and a 'Highly motivated learner'. The study raises awareness about learners who still need significant levels of support from teachers as well as a degree of social interaction with peers during the process of self-study. This can be implemented without much difficulty through online applications abundantly available at present; self-study does not have to be a lonely path.

Keywords: English self-study package, EFL lower level proficiency, electronics engineering, individual Differences.

1. INTRODUCTION

The need to develop workforce competencies result from today's knowledge-driven economy, globalization and digital disruption (Laal & Salamati, 2012). Various kinds of rapidly changing information and communication technology (ICT) can be retrieved from online sources. Global citizens in the 21st century need to be self-reliant and autonomous in the sense that they can exploit easily obtained resources to serve their personal, professional and social needs and development. These characteristics constitute modern technology-facilitated lifelong informal learning, many types of which are untaken in order to meet the growing need for English learning for the workplace. This learning takes place regardless of place and time, and outcomes largely depend on one's own availability and desire.

As the latest ICT and professional knowledge are widely presented in English, worldwide 21st century manpower needs English language competency to be effective (Patil & Karekatti, 2012; Zaharim et al., 2013). In Thailand, engineering staff possess various levels of English proficiency. Those at a management level, perhaps not surprisingly, appear to have a higher English proficiency level, while those who work at the administrative level or as engineers still have limited proficiency in English (Hart-Rawang, 2009). No matter what level and position, however, individuals have varying time, workload, and other limitations. These differences affect their English learning needs, opportunities and means of development. Hence, informal learning via accessible self-study packages can enhance English language learning of engineering staff.

In this study, a self-study package intended to develop the English of Thai engineering staff was delivered in two provinces located in a central part of Thailand. The self-study package included technical, business and daily life language contents, some of which were available to take directly from the internet and naturally interesting. The study aimed to examine efficiency of the self-study package and learners' satisfaction. However, when the individual learners used the self-study package for their English language development, there were clear differences with regard to its effectiveness and learners' level of satisfaction with the package. This was due to self-perception and learner personal backgrounds and experiences.

Research Objectives

1. To examine the effectiveness of an English self-study package for electronics engineering staff.

2. investigate learners' opinions and personal learning experience with regards to the English self-study package.

Research Questions

1. How effective is the English self-study package for the electronics engineering staff?

2. What do the enrolled learners think about the English self-study package?

3. Are there any differences in the way learners make use of the English self-study package for their English development?

2. Literature Review

In learning language, people tend to go through some certain stages i.e. from memory to creativity (Bloom, 1956), from cognitive to autonomous (Fitts, 1964; Fitts & Posner, 1967), from comfort zone to uncertainty and growth (Phan & Ngu, 2021; White, 2009), from meaning construction to language construction and language learning (Halliday, 1993). Kolb (1984) proposed the theory of experiential learning, emphasizing four groups of learning styles (assimilative learning style, accommodative style, convergent style and divergent style). Specific learning tasks and environments should be arranged to serve particular learner types and it is crucial to provide activities and circumstances that provide support for learners with different learning styles. Despite debates on the practical aspects and success of learning by means of personal learning style arrangement (Newton & Mia, 2017; Rohrer & Pashler, 2012; Willingham et al., 2015), the concept of learning styles was applied to design learning circumstances that match learners' preferred learning styles (Abella & Salinas, 2006) as well as applied in the design of online distance learning courses (Richmond & Cummings, 2005; Simpson & Du, 2004). In this study, the experience of individual learners using the same self-study materials appeared highly personal and indivisualized. For a better understanding of learning of an individual, then, a broader worldview theory of learning has to be considered.

Under the principles of sociocultural theory derived from Vygotsky (1978)'s work on learning and mental development, the human mind is mediated. Lantolf (2000) claims that

… just as humans do not act directly on the physical world but rely, instead, on tools and

labor activity, which allows us to change the world, and with it, the circumstances under which we live in the world, we also use symbolic tools, or signs, to mediate and regulate our relationships with others and with ourselves and thus change the nature of these relationships. (p.1)

Language is one of the symbolic or higher-level cultural tools (Lantolf & Thorne, 2006) used as a means of communication, giving rise to changes in human learning, relationships, and, in turn, changing the world. Based on interaction with others and their milieus, the convergence of human thinking is organized and internalized, which constitutes to the process of mental development. This is what is called internalization (Vygotsky, 1978). The development of the human mind relies significantly on internalization and can be explained by the concept of the zone of proximal development (ZPD), defined, in part, as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p. 86). Given human learning and development, the process is endless, especially when individuals have opportunities to interact voluntarily in the social contexts that are most relevant to their needs, for example, the workplace.

When people are conscious of what they need, they set their own goals and means to achieve the goal set. In the researchers' view, in the performance of self-study for informal learning the element of learners' social interaction may drop to lower levels. However, the ways in which individuals interact with the social context provided by any learning material may remain once learners find that learning material relevant to them. Again, how individual learners perceive and interact with social elements contained in a material may vary, depending upon learners' personal perception and experience. To guide the present study as a theoretical framework, a model of self-study learning development is proposed, as shown in Figure 1.
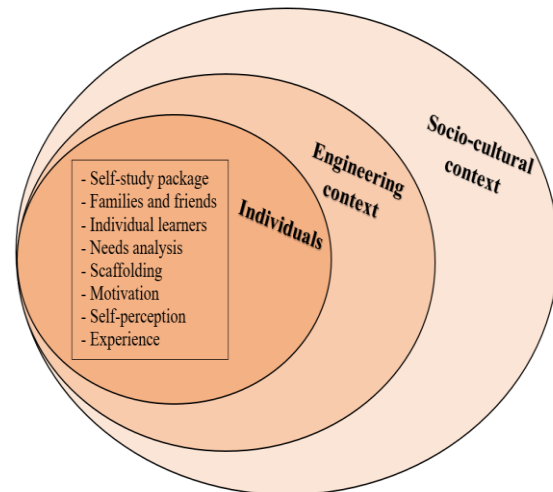

Figure 1: *Self-study Learning Development for Engineering Model*

According to Figure 1, there are three main contexts influencing the self-development of

individual engineering learners in the current study: socio-cultural context, engineering context and the learners as individuals. All of these are set within the view of sociocultural theory, emphasizing the learner's interaction with the world in relation to social and cultural contexts the learner lives in. To be more specific, in regards to the learning development framework depicted here above, the notion of the zone of proximal development (ZPD) can be used to illustrate the benefits of the self-study package used in the learning process. At the narrower contexts of individuals, though those contexts are intertwined, when the engineering staff made use of a self-study package which is regarded as a tool and symbol of learning development, they conducted a self-study process and, at the same time, their private speech fostered their understanding of the lessons. In terms of activities, the learners might get started with the pretest and subsequently and gradually work on the lesson task by task. Since the lesson content is relevant to the learners' work, interaction with the package was meaningful and engaging to the learners. Likewise, learners' use of the package can be explained by the concept of scaffolding. Bruner (1978) claims that scaffolding is related to "the steps taken to reduce the degrees of freedom taken in carrying out some task so that the child can concentrate

on the difficult skill she is in the process of acquiring" (p.19). In this study, the package was designed and developed to assist learners to complete a more difficult task step by step, aligned with and informed by these learning theories.

Lifelong learning

Longworth (2003) defines lifelong learning as the process of equipping learners with learning tools. With these tools, learners can continue their learning after school on their own pace and time to serve their learning styles and needs, complying with the idea of learning in the 21st century. According to Dunn (2003), there are three types of lifelong learning: formal, informal and non-formal learning. These consist of learners' attitudes, performances and knowledge gained through daily life experiences. While formal learning requires systemically planned settings, informal learning involves learners' lives at work and home. For non-formal learning, professional practices are acquired at the workplace.

Informal learning takes place in an unstructured setting and in various forms, e.g. self-studying, watching video, and playing games. In addition, informal learning is perceived as asynchronous learning, and a learning style in which the learners determine their own aims and objectives (Training Industry, 2020). In material designs for engineering staff at the workplace, their learning, therefore, takes place in an informal way. Materials designers should utilize various kinds of materials such as movies, songs, online dictionary, and websites, so that learners are naturally motivated to practise their English.

Self-study package as authentic and edutaining materials

When performing self-study, learners need to initiate their own goals and learning paths. One of the important features contributing to the success of self-study is learning material which provides cognitive structure, stimulating, achievable challenges and interesting contents (Brenes, 2012). Needs analysis can be an effective tool leading to development of materials relevant to learners' needs, lifestyles

and careers. These kinds of materials should be more or less real-life in their contexts and contain a sense of pleasure. Hence, authenticity and edutainment should be well integrated into self-study materials.

An authentic text is as a text that was created to fulfil some social purpose in the

language community in which it was produced (Little & Singleton, 1988, p.21). Authentic texts

are developed to serve specific purposes of native speakers in the language community (Little &

Singleton, 1988; Lansford, 2014) for real-life purposes (Ellis & Johnson, 1994) and not for teaching

or learning goals (Bacon & Finnemann, 1990; Buendgens-Kosten, 2014). Oguz and Bahar (2008)

mentioned that learning English through authentic materials benefits learners as they can easily link

what they learnt from the materials to their real world at work. Moreover, authentic materials used

for teaching include texts (e.g. brochures, application forms, menus), visual images (e.g. maps,

diagrams, ads), clip selections, and teaching resources particularly designed for instructive

purposes. Additionally, created materials including textbooks and other adjusted teaching resources containing specific syntactic and discourse features (Richards, 2021).

As authentic materials are designed for real use, not for language learning purposes, it may often be too complicated to use with EFL learners at lower levels of English proficiency. Various grammatical structures, sentences, terminology, real-time speech rate and background noise can be sources of problems. Semi-authentic material, instead, might be more plausible as it is based on authentic formats but with simplified language and

controlled cultural aspects (Anthony, 2018) to meet learners' language levels and serve their needs and interests.

Edutainment, a combination of education and entertainment (Aksakal, 2015), is stated as one of the main components in English learning. Colace et al. (2006) furthered that edutainment is employed to support education with entertainment. Learners could have an enjoyable time with creative experiences of learning (Aksakal, 2015). Also, the learners may learn better in a more relaxed and amusing atmosphere such as learning with songs, TV series, cartoons and online games (Abdalla, 2015). This is in line with Okan (2003) stating that the main goal of edutainment is to get learners' attention and to motivate them to concentrate on the processes of learning experiences and accessing materials. Moreover, these sources of material can be easily accessed online via different digital channels such as YouTube, Netflix and the BBC English learning website. Learning English through edutaining materials provides learners with not only knowledge of the language, but also culture. Finally, Anikina (2015) emphasizes that edutainment can enhance learners' technology skills used to retrieve information available via suggested online portals.

Individual Differences

Individual differences have a potentially significant influence on language learning processes. According to Dornyei (2005), individual differences could be divided into three main aspects: motivation, cognition and affection. Although motivation plays an important role in language learning, different learners might be motivated for different reasons. Some learners might learn a language with the purpose to integrate into a community that speaks the target language, or might learn the target language in order to advance their career. Others might learn the language because they love to, as Gardner (1985) referred to as integrative motivation. Also, learning styles seem to have an influence on learners' performance. There are learners who may learn well through the application of grammatical rules, whereas others take a memory-oriented

approach (Benkhenafou, 2015). There are also learners who learn well, or are more motivated to learn through the use of visuals, and images (Badrkoohi & Maftoon, 2017). Regarding learners' differences for language learning approaches, it was found that the most effective approach for students with one particular learning style proves not to be the most effective one for students with a different kind of learning style (Pashler, McDaniel, & Bjork, 2008). It was also revealed that individual language learners can differ over a broad range of factors, including individual aptitudes, thinking processes, and how individual learners process various kinds of information. Filgona1, et al. (2020) concludes that different learners may achieve their goals but only when they are truly engaged. It was pointed out that highly motivated individuals are more likely to be ready to learn more, while unmotivated learners may likely to learn very little.

Liu (2015) examined the importance of, and relationships among, various self-perception factors for being a qualified teacher and their direct and mediated effects on self-learning activities among Taiwan teacher education students. One of the findings indicated that self-perceptions played a crucial role in facilitating self-studying. Rhodes (2015) examined relationships between self-perception of reading, writing, spelling, and mathematics competence. The results revealed that self-esteem helped enhance learners' academic success and their overall positive social change. Thus, self-perception could be used as a predictor of academic performance in adolescent learners with limited learning abilities.

Oxford (1993) examined differences between the use of strategies between more and less successful learners such as the effectiveness of strategies used and the choice and number of used strategies. Apart from differences between more and less successful learners, differences among individual learners were also reported. The study revealed key differences in learning strategy preferences, learning styles and patterns of language use. Implications of the study are presented and discussed. A concrete learner preferred to learn via playing games,

paying attention to the pictures, and watching films. An analytical learner preferred to study grammar and analysis of learners' problems. A communicative learner preferred to listen to native speakers, talk to friends and watch Youtube English channels (Siregar & Haswani, 2020).

Not concentrating on individual differences as such, Cohen and Olshtain (1993) attempted to group their fifteen advanced EFL undergraduates according to similarities in their approaches to the production of six speech act utterances (two apologies, two complaints, and two requests). Note that the students were asked to plan individually and to execute the speech acts with an English native speaker. The researchers found that their students, in spite of being similar in terms of English language proficiency, could be classified into three categories according to their apparent production styles. These categories were 'metacognizers, avoiders, and pragmatists'. It is however possible that in Cohen and Olshtain's (1993) study, further differences among students within each category might still exist.

To the researchers, differences amongst learners' performance seems to be affected by language learning elements, i.e. the approach individual learners take, motivation, self-perception, personal styles or personal preferences, past learning experience, and effectiveness of learning. Examining differences amongst learners will help to provide insights into various possible options that learners might take in order to learn, especially when they learn by means of the self-study. Knowledge about variation between learners may assist the development of appropriate approaches, and materials used to serve individual learners in different contexts of electronics engineerings in learning and using language.

3. Research Methodology

Participants

After testing the instruments, the participants voluntarily taking part in this study were 20 engineering staff in two factories located in the central part of Thailand. The samples were selected by a convenience sampling method. All of these participants studied all the nine units in the self-study package at their own pace, approximately 30 hours, from March to May, 2020.

Self-study package

The self-study package was developed based on the needs analysis of English for Engineering Staff in the Electronics Industry in Phra Nakhon Si Ayutthaya and Pathum Thani Provinces, Thailand (Kluensuwan et al., 2019). The results of the needs analysis revealed that the engineering staff preferred to study English at their own convenience because of their time, work and personal constraints. It was also reported that they could spend approximately 30 hours for the self-study program. The program content should be related to their specific field of electronics, business, and general contexts. To serve the needs of the engineering participants, learning English through entertainment in their free time, the learning tasks in this package were set in relaxing situations, such as listening to songs and watching movies. Additionally, the lifelong learning habit of using online resources, such as online dictionaries, educational websites, and YouTube, were promoted through the instructions, activities, and assignments in the self-study package (see Table 1).

Table 1 *Self-study package contents*

Units	Key	Self-study resources
Unit 1 An Impressive First Meet	Speaking & Listening	Video clips, the British Council website
Unit 2 What Do You Call These Items?	Reading, Vocabulary	-
Unit 3 Reading at Work	Reading,	Video clips
Unit 4 Singing and Using an Online Dictionary	Pronunciation, Reading, Listening & Speaking	YouTube, Online dictionaries
Unit 5 Food at a Factory Canteen	Listening, Speaking & Writing	Video clips
Unit 6 Presentation on Products and Sales	Listening & Speaking	Video clips
Unit 7 A Factory Visit	Listening & Speaking	Video clips
Unit 8 Writing an Email	Reading & Writing	Online template links
Unit 9 A Memorable Goodbye	Listening & Speaking	Video clips

Table 1 reveals the unit contents, key and self-study resources of the self-study package. The format and sections in each unit were designed with the edutaining theme of football, moving through sections titled Warm-up, Kick-off, Let's Play, Score a Goal, and Take a Free Kick. The learners were recommended to spend approximately 30 hours for completing the package.

Pre- and post-tests

To assess the effectiveness of the package, all of the participants took the pre-test before starting each unit and the post-test after completing it throughout the self-study period. In the pre- and post-tests, there were 10 items for each unit contents, totaling 90 items. The format of the test items was multiple-choice. There was no time limitation for test taking.

Learners' satisfaction questionnaire

The five-point rating scale questionnaire aimed to find out learners' satisfaction with the package. It consisted of three parts: contents, media production technique and efficiency of lessons. After studying all the nine units and completing all the post-tests in the package, the participants were asked to rate their overall satisfaction level with the self-study package.

Instrument validation

The content validity of the self-study package, pre- and post-tests, and satisfaction questionnaire were examined by three experts in the relevant fields: two English as a foreign language teachers and one engineering lecturer, all with at least 10 years of teaching experience. The contents of the self-study package were improved according to the experts' comments. Feedback from participants regarding formats and instructions in the pilot study were also taken into consideration. The Index of Item-Objective Congruence (IOC) technique was employed to ensure the validity of the test and questionnaire items. The IOC score of the questionnaire was 0.83, and the IOC score of the pre-/post- test was 0.80.

Data collection and analysis

The researchers tried out the unit contents, the pre- and post-tests and the questionnaire with the pilot group of the 295 engineering student participants who shared similar background knowledge of learning English as a foreign language in a second year of bachelor's degree

and had already studied two basic compulsory English courses. Due to the availability of the pilot students, each unit was assigned to different groups of the participants. The pilot study participants were assigned to take the pre-test before the unit learned. When finishing the assigned specific units, they were asked to complete the post-test for identifying their learning progress.

After that, engineering staff participants were voluntarily recruited to take part in this study. The participants at two research sites were introduced to the study and asked to take the pre-test. Then the self-study package was provided with instructions for using the package. The self-study period ran from March to May, 2020.

The data from the tests and the questionnaires were analyzed in the form of mean and standard deviation. The mean scores of the pre- and post-tests were compared using t-test at a significance level of .05.

4. Findings and Discussions

1. Effectiveness of the self-study package

Table 2 *Effectiveness of the self-study package*

Lessons of self-study package for engineering staff	Pre-test		Post-test		t	Sig
	$\overline{X}$	SD	$\overline{X}$	SD		
Unit 1: An Impressive First Meet	4.24	1.64	5.79	1.36	8.853	.000*
Unit 2: What do You call These Items?	4.21	2.25	6.12	1.80	5.694	.000*
Unit 3: Reading at Work	4.91	1.23	7.81	0.90	13.392	.000*
Unit 4: Singing and Using Online Dictionary	4.46	1.44	7.37	1.66	12.899	.000*
Unit 5: Food at a Factory Canteen	6.40	0.97	7.40	0.84	4.743	.001*
Unit 6: Presentation on Product and Sales	6.10	0.88	6.90	0.74	4.000	.003*
Unit 7: A Factory Visit	4.50	1.44	6.44	1.59	12.489	.000*
Unit 8: Writing an Email	4.60	1.06	7.97	1.01	15.802	.000*
Unit 9: A Memorable Good-bye	6.65	2.03	7.21	2.42	3.103	.004*
Total scores	**5.12**	**0.98**	**7.00**	**0.75**	**5.605**	**.001***

From Table 2, the top three lessons with the highest post-test scores were Unit 8:

Writing an Email (Mean=7.97, SD=1.01), Unit 5: Food at a Factory Canteen (Mean=7.81, SD=0.90), and Unit 3: Reading at Work (Mean=7.40, SD=0.84), respectively. On the other hand, the lessons with the lowest post-test scores were Unit 1: An Impressive First Meet (Mean=5.79, SD=1.36), Unit 2: What Do You Call These Items? (Mean=6.12, SD=1.80), and Unit 7: A Factory Visit (Mean=6.44, SD=1.59). As we can see from the table, learners mentioned that they could use the materials for work and daily life. For example,

I can use this knowledge for my presentation. (EN06)

I can use the vocabulary to chat with foreign colleagues when I learnt this chapter (food). (EN05)

The lessons can be used for everyday life. (EN01)

I can prepare to use for the future. (EN02)

The unit with the highest scores taken by the participants was Unit 8: Writing an Email (Mean = 7.97, SD = 1.01). As they had learning experience of reading text types at the workplace in Unit 3: Reading at Work, they could adapt their knowledge of addressing the receivers and contents of the different types of texts at work. The email formats and contents concerned with the problems possibly found and reported in the factory. Communication with the customers by email is commonly used as formal business transactions between organizations. Therefore, the participants could perform better than the other units. As they shared in the extracts of the interviews as follows:

It can be used in the field of engineering, as well as various fields, such as administrative

work, especially Chapter 3--it's all about technical stuff. (EN03)

Knowing how to write an English e-mail is useful when applying for a job. (EN07)

2. Participants' overall satisfaction towards the use of self-study package

Table 3 *Participants' overall satisfaction towards contents of self-study package*

Contents criteria	Mean	SD	Interpretation
3.1 Clear instructions	4.26	0.68	High
3.2 Ability to encourage the use of online media for self-study	4.04	0.66	High
3.3 Up-to-date contents	3.98	0.71	High
3.4 Appropriate difficulty level	3.96	0.80	High
3.5 Appropriate answer keys	3.95	0.76	High
3.6 Interesting contents	3.92	0.78	High
3.7 Clear contents	3.92	0.72	High
3.8 Adequate contents	3.86	0.79	High
3.9 Appropriate contents arrangement	3.80	0.75	High
3.10 Understandable contents	3.80	0.74	High
3.11 Appropriate introduction to the contents	3.76	0.75	High
3.12 Appropriate language use	3.70	0.75	High
3.13 Facilitating self-studying	3.63	0.77	High
3.14 Stress-free study materials	3.60	0.88	High
Total	3.87	0.74	High

From Table 3, it is revealed that the self-study package was effective with clear instructions and up-to-date contents that promoted learners' online engagement due to the fact that three main areas rated highest by the participants were the clarity of the instructions (Mean= 4.26, SD=0.68), the ability to encourage using online learning media (Mean=4.04, SD=0.66), and up-to-date contents (Mean=3.98, SD=0.71), respectively.

One of the interesting findings was that the participants rated the self-study package as stress-free learning package at a high level (Mean=3.60, SD= 0.88), although the majority of the contents were technical-based in the field of engineering. This might stem from the fact that some of the units were considered edutainment. Also, the participants perceived that the package helped facilitate self-studying (Mean=3.63, SD= 0.77). The use of appropriate language in the package was also rated at a high level (Mean=3.70, SD= 0.75). The data from the interviews supported the participants' positive attitudes and suggestion towards the content and activities in the self-study package.

Content interesting and vdo helps more of the understanding... Not too long, not boring. At the right

amount. (EN 01)

The content is good and concise. It's not too long, so I don't get tired of reading it. The time of study

depends on individual's ability of English. (EN04)

The content is useful, but I want to see more pictures in this chapter (presentation). (EN05)

These chapters are updated that I can use for work and everyday life. (EN06)

The length of contents was okay. (EN08)

These chapters (food and presentation) are not too difficult for me. I can complete all exercises. (EN08)

I think the content is not too difficult for me. I can give it 8 out of 10 for the appropriateness

for learners in general. It's not too hard, really, or too easy. I can learn through the package without difficulty. (EN03)

The participants reported that the content in the self-study package is interesting, useful, and up-to-date. It can be used for everyday life. They also learned new vocabulary and expressions. The length of the lessons is

concise and at the right amount. As a result, they did not get tired of reading it.

Table 4 *Participants' overall satisfaction towards media production techniques of self-study package*

Media production techniques criteria	Mean	SD	Interpretation
4.1 Appropriateness of time use for each unit presentation	3.73	0.75	High
4.2 Appropriateness of visuals and video in each unit	3.65	0.71	High
Total	3.69	0.64	High

Table 4 reveals the participants' overall satisfaction with media production techniques used in the self-study package. They agreed that both time used and visuals support were appropriate at a high level. The suggestions include more pictures, colorful visual content rather than black and white, and presenting in the form of an e-book.

With regard to the periods of time used, the data from the interview reflected the fact of how the learners find some free time to perform the self-study, as shown in the interview extracts underneath:

I have to work too. So, I spent some time over the weekend to study. It took me no more than an hour to finish a unit. (EN01)

Need extra time to do the activities. . . (EN02/EN)

Use free time or after finishing the work 40 minutes. (EN02)

I study this package in my free time, I used to study this kind of the material. (EN06)

Need extra time to do the activities. (EN02)

Use free time or after finishing assignment of other subjects about 40 minutes. (EN02)

If I have enough time for doing exercises, I try to search for choosing the right answers

and skip the unknown parts. Then I come back to review them again (EN08).

Table 5 *Participants' overall satisfaction towards the efficiency of self-study materials*

Efficiency criteria	Mean	SD	Interpretation
5.1 Gain of knowledge after using the self-study package	4.24	0.72	High
5.2 Commitment to continue self-development with online media after using the self-study package	3.99	0.80	High
5.3 Ease and convenience	3.62	0.85	High
Total	3.95	0.60	High

Table 5 reveals that the participants had positive attitudes towards self-study materials, including a reported gain of knowledge after using the self-study materials (Mean=4.24, SD=0.72), commitment to continue self-development with online media after using the self-study (Mean=3.99, SD=0.80) and ease and convenience (Mean=3.62, SD=0.85), respectively. The data from the interview, also supported these results, as shown in the following extracts:

I will suggest friends to study lesson as Lesson 7 is very useful... Learn new vocabulary expression. (EN02) After I did the pretest, I self-studied the package and did the posttest. I did check the answer key at the back of the package after the tests. I got a higher score, 1-2 points more than the pretest one. (EN04)

I am satisfied with my learning results as I guessed I improved at 9 out of 10. I've got better knowledge and the conditions. (EN07)

Overall, the participants were satisfied with and aware of their progress. They saw the evidence from the pre-test and post-test scores. They also agreed that the self-study package was considered efficient with regard to the contents and learners' ability to comprehend and learn. The self-study materials contained various available online resources such as dictionary and the British Council English learning website (https://learnenglish.britishcouncil.org/) that both introduced and may encourage the

participants to continue the use of these resources for their self-studying of English. However, the interview revealed that some of the participants have already had the habit of using the internet for self-learning as shown in the extracts below:

I did use Google Translate to help my self-study. (EN03; EN04)

If I am not sure about my answer, I will utilize the Google to find information for the best answer.

(EN05)

When I cannot do the exercise, I retrieve the information from Google. Sometimes, I read more on

another webpage if I want to learn more. (EN06)

When I don't understand, I search for more information from YouTube and Google. (EN07)

The self-study package, hence, encouraged the learners to make use of the internet for their self-study. In a different manner, the data from the interview reported that there were some technical difficulties with regards to when the lessons require them to watch videos from the Internet as shown in the interview extract below:

It is not so convenient to listen and watch the VDO from the internet or QR code as I need my phone. (EN02)

It is, therefore, important that material designers anticipate problems that might occur

when learning activities require extra tools, instruments, or the internet as these difficulties can hinder the effectiveness of the learning.

Individual differences

As mentioned earlier, this study aimed to investigate the effectiveness of the self-study material designed based on need analysis of 20 engineering staff in the workplace in Phra Nakon Si Ayutthaya and Pathum Thani Provinces. To the researchers, all factors both quantitatively and qualitatively reported so far, including learners' experiences of the success and satisfaction, their involvement as well as strategy use so far reflected the general picture of how the samples in this study dealt with the self-study package. However, when examining individuals, some differences were traced. The four case studies reported below supported this claim. It is also important to investigate learner varieties in order to raise the awareness of material makers that even at earlier stages an analysis of the needs of the paralleled samples should be carefully carried out, as individual differences are crucial to the success of the program. Also, there might be some particular signs that may lead to ineffectiveness of use of the package, which could be avoided, if detected well in advance.

The four samples, although appearing to be homogeneous in terms of their area of work and workplaces, differed as individual persons, and could be identified as having a tendency to perform as a 'strongly determined learner', a 'relaxed learner', a 'digital-literate learner', and a 'highly motivated learner'. Table 6 below summarises and discusses the differences among the four cases.

Table 6 *Individual differences*

Cases	James	Christ	Lisa	Katthy
Self-perception	-Picture himself as a slow learner	-Picture himself having basic to average English proficiency	-Picture herself having lower proficiency than her actual English ability	-Picture herself as a pre-intermediate learner of English
Motivation	-Want to develop grammatical structures and vocabulary -Volunteer to join the	-Want to develop English speaking and listening - Be encouraged by his	-Want to develop technical terms Be aware of her own lack of technical terms	-Want to develop phrasal verbs, combination of words, email writing

	program -Be aware of importance of English language ability and want to improve English language skill	boss to join the self-study program - Realise benefits of the self-study package regarding his email writing -Perceive that English speaking is not needed at work	and language use in a field of electronic engineering and want to fulfil this lack	- Look for ways to develop English by herself - Use English as a tool to keep in touch with foreign friends -Join the program even the awareness that her English proficiency was higher than the level expected from the program -Want to get a self-study package of her own for free
Background	-Have good support from family since young for two foreign language learning—English and Chinese -Find his Chinese proficiency better than English -Have impression on learning English with English native teachers, whom he said was kind	-Be a new graduate in human resources -Used to be afraid of talking to foreigners -Realise the importance of the two units, Unit 7 *A Factory Visit* and Unit 9 *A Memorable Goodbye*	- Have good linguistic background which made her feel confident in both spoken and written English -Used to change the field of study from English language major to business administration - Realise the importance of technical terms of Units 2 *What do You Call These Items?,* and Unit 3 *Reading at Work* -Realise the importance of Unit 8 *Writing an Email* regarding the practical aspect of the units to her job -Take a couple of months to finish studying the self-study package	- Have foreign friends to chat or Line with - Realise the importance of English towards her career progression
Learning Styles	-Strictly follow the instructions in the materials step-by-step -Have ability to prioritise work -Have ability to manage work stress -Need someone to help	-Meet the minimum requirements of the tasks (Do not mind about the post-test scores) - Prefer to study the package at his leisure -Do not use links for	-Possess effective time management by using her free time at work to perform the self-study for an hour a day -Be humble but confident to do the self-study on her own	- Use her free time in the evening at home, about an hour per day to study the package -Learn well with different kinds of digital supports embedded in the

	summarise key points of each unit -Want to interact with other learners while studying - Watch movies and listen to songs in English	video clips -Prefer the self-study material -Prefer to use the familiar expressions rather than the newly studied ones from the material - Listen to songs in English - Have no definite plan on how to progress for further development	- Be a visual-type learner looking for visual supports like subtitles of certain video clips, memo, notice, or announcement -Prefer the self-study package in the form of e-learning or e-book visual support such as pictures, diagrams, and authentic-like materials - Be aware of her own weaknesses, e.g. technical terms for engineering work	materials - Utilise the Google website to help check the answers - Use links available on the Google application to learn more on various topics of her interests - Make use of key vocabulary from each unit, technical terms, signposting in the presentation, and an e-mail writing - Consider whether the content was interesting and what she would get from the reading
Learner Types	A Strongly Determined Learner	A Relaxed Learner	A Digital-Literate Learner	A Highly Motivated Learner

The discussion of differences of the four case studies is divided into two main areas: self-perception and motivation.

Self-perception

Considering self-perception towards English proficiency, although the participants in the four case studies perceived themselves as lower level of English proficiency, there were still some differences. James reported that he was a 'slow' learner, implying the sense of being ineffective. Christ reported a wide range of proficiency as he stated a range from 'basic' to 'average', giving the impression of being less concerned about his level of proficiency. Lisa, based on the researchers' own impression during the interview session with her, pictured her English proficiency lower than her actual level. Only Katthy gave a neutral comment on her proficiency as 'pre-intermediate'. It should be explained that individual learners' perception towards themselves may affect their use of the self-study package and English development. This is in line with the results of Liu's study (2015), which reveal that self-perception influenced self-learning activities among teacher education students. Their self-perception plays a crucial role in facilitating self-learning.

Different from James, Christ did not seem to concern much about his own proficiency. Being less concerned about one's own proficiency could have a negative effect on their progress. Badrkoohi and Maftoon (2017) found that perception towards one's own English was related closely with L2 motivation. In this current study, a blended approach with some degree of teacher's intervention can be a way to assist learners who are less confident, or perceived their English proficiency lower than their actual ability, as in the case of Lisa and Katthy. It might be able to support a learner like Christ, who took a rather relaxed approach for his self-study.

Motivation

Motivation found in using this self-study package includes English learning for everyday use such as chatting with foreign colleagues

and customers; using English for technical matters such as administrative work, technical matters and work presentation; using English for future work such as emails in English for job applications.

However, when examining individual participants, differences in their motivation existed. The four participants had different motivation to join the self-study program, comprising seeking possibilities to develop English skills, voluntarily participating when there was an opportunity, fulfilling one's own lack, and responding to superior's encouragement. They, apparently, aimed to develop their English language ability as a tool for their work. Katthy added that she used English as a tool to keep in touch with her foreign friends. She could be considered as an opportunity seeker of English language learning in order to develop her listening and speaking. By keeping in touch with her foreign friends, either via Chat or Line, her friends helped correct her English speaking and writing, which she was happy about that. The fact that her friends did not mind that she made a mistake, and that she was really able to communicate in English with foreigners could help motivate her in learning English. James had an impressive foreign language learning with English native speakers, whom he felt relaxed to study with and to make mistakes. His mother supported him in studying English with a personal tutor. Later on she encouraged him in studying Chinese language. James's positive experience regarding English and Chinese learning could have strong influence on his motivation towards his active performance regarding his self-study of English language. This is supported by Badrkoohi and Maftoon (2017) who found that L2 learning motivation had the highest correlation with L2 learning experience. In addition, Dornyei (2015) and Papi (2010) exemplified these learning experiences had a strong impact on learning success.

Unlike James and Katthy, Christ experienced being too afraid to talk to foreigners, but was encouraged by his superior to join the self-study program. His past experience may have an effect on his motivation. Superficially,

Christ appeared as a relaxed learner, not taking an active learning approach. He did not specifically identify himself the level of his English proficiency. He did not have a definite plan on how to progress his study. More importantly, he aimed to meet the minimum requirement and did not care about the post-test scores. He preferred familiar language to words or expressions newly learnt. This style of learning is similar to the so-called 'passive' (Halvaei & Ansarin, 2018), and may hinder learning development. Care and consideration are needed in order to avoid learners like Christ becoming demotivated, getting bored and eventually dropping off in the middle of the program. According to DAĞGÖL (2014), a positive learning atmosphere, on the contrary, has a role in fostering individual learners' eagerness to learn. In addition, effective scaffolding (Vygtsky, 1978) and fruitful interaction can be an effective way to assist learners like Christ.

Interestingly, James, who was highly motivated to join the self-study program, mentioned that he would like to have a teacher's summary. He also mentioned that he wanted to interact with other learners during the study sessions. Positive environments such as encouragement from instructors or other learners could be a means to create positive environment for language learners like James. This is supported by Richmond and Cummings' (2005) study on the arrangement of learning environments adapted from Kolb (1984), mentioning that the effective learning environments require positive reinforcement provided by teachers' guidance, and teacher and peer feedback allowed by digital platforms. In Richmond and Cummings' research (2005), the reflective spaces within learners' communities, e.g. responses and discussion rooms should be open to learners who prefer this kind of learning context. Moreover, some learners still need human interaction to construct and negotiate meanings even when relying on self-study schemes.

Apart from Christ, whose learning approach could be considered as minimal and relaxed in manner, the other three participants appeared to be more effective learners. Their learning

management sounded effective, though with some differences. James formally and strictly followed the self-study package step by step. He also needed social interaction, i.e. an interactive session for teacher's summary and peer interaction, whereas Lisa was able to manage her free time at work to study the self-study package. She was confident and aware of her English ability. Katthy, slightly differently, clearly mentioned that she needed to improve her reading, writing, presentation, vocabulary, and technical terms. Katthy also wanted to utilize available online sources for self-study. Therefore, the four learners were likely to be considered as a strongly determined learner, a relaxed learner, a digital literate learner, and a highly–motivated learner.

5. Implications

From the researchers' points of view, self-study learning does not need to be a lonely path, where students study by themselves and on their own. Instead, new digital technology such as the use of MS Teams or zoom can be applied to support the self-study procedure. This blended approach where an instructor can be present online can assist less confident learners. It might support a learner like Christ, who took a relaxed approach for his self-study. Providing an opportunity for self-study learners to interact with one another may contribute to more active learning with clearer and more practical goals.

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