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Scaffolding Assignments to Conciliate the Disinclination to Employ Project-Based Learning of English Pronunciation and Autodidacticism

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Abstract
Acknowledged as a far-reaching pedagogical method, Project-Based Learning is nationally imperative in Indonesian education despite the disinclination of its execution. This paper scrutinizes the phonetics and phonology-based English pronunciation dimensions and scaffolding traits as the bases to devise the scaffolding assignments for PBL execution, explores the process of PBL with scaffolding assignment adoption, and examines whether the exertion of the PBL enhances the academic achievement of English pronunciation and autodidacticism as Self-Directed Learning skills. The study exploits design-based research through repetitive actions of analysing, designing, developing, implementing, and evaluating. The result exhibit that the scaffolding assignments are designed by decomposing the phonetics and phonology pronunciation-related conceptions into smaller tasks of English pronunciation learnings and trainings based on instructional scaffolding fundamentals. The scaffolding assignments infused PBL is applied through orientation, action, reflection, and presentation stages which cover the learning activities of launching the project as the entry event marked with the driving question disclosure; building knowledge, understanding, and skills to answer the driving question; developing the project products and answers to the driving question; and presenting the products and answers to the driving question. The exertion of the PBL with scaffolding assignments is proven influential in promoting the students' English pronunciation and Self-Directed Learning skills.

Keywords: Scaffolding assignment; English pronunciation; project-based learning; autodidacticism; self-directed learning skills

Introduction

Scaffolding assignments have been employed to cultivate various skills in different fields of studies using different models of learning in the last two decades. They are utilized to develop research skills—developing topic, selecting sources, and nourishing citation skills—through a so-called Scaffolded Library Research Assignments in *Roots of Contemporary Issues* Course (Saulnier et al., 2021), to cultivate students' academic literacy in the writing class of English for Academic Purposes and TESOL (Webster & Green, 2021; Suprayogi et al., 2024), to enhance students' scientific skills (the skills in experimental design, data analysis, and scientific writing) in *Introductory Organismal Biology* Course (Killpack et al., 2020), to promote student engagement and the ability to create well-written mathematical proofs (Abrahamson, 2019), to bolster students' metacognitive awareness and self-regulate learning behaviours in Biology (Cardinale & Johnson, 2017; Gunawan et al., 2024; Cardoso et al., 2023), to improve argumentative and communicative learning processes and collaboration in Danish and British English (Slot, 2015), and to expand designing skills of a computer simulation (generate an idea, transform the idea into an assignment, and evaluate the assignment (Vreman-de Olde & de Jong, 2006; Ibrahim, Abduh, & Korompot, 2023). Scaffolding assignments have been exploited to boost research and scientific skills, academic literacy, metacognitive awareness, self-regulated learning behaviours, argumentative and communicative learning processes, and collaboration in the fields of history, first and second language learning, biology, mathematics, and computer designing.

Numerous pedagogical methods and techniques have also been blended with scaffolding assignments. They are practiced together with online peer-review to enable students write an abstract and an open-ended economic argument (Cohen & Williams, 2019; Husnia et al, 2023), with a case study to grow students' scientific literacy skills through traditional lecturing and distant learning (Monk & Newton, 2018; Mahmud et al., 2024; Tong, 2024), with targeted and personalized feedback for academic and critical media literacy acquisition (Kelly & Brower, 2017; Ramdani et al., 2024), and with problem-based and case-based activities to improve students' learning in accounting (Abraham & Jones, 2016). Scaffolding assignments are malleably adopted with pedagogical processes of online peer-review, case study, targeted and personalized feedback, problem-based learning, and case-based learning. Scaffolding that underpins scaffolding assignments empirically shows its agility to promotes different skills in distinct areas of study through diversified didactic activities centralized to learners such as learning on the basis of problem, case, or project.

Project-Based Learning (PBL), despite the hesitation it brings due to the absence of regular face-to-face meetings and the administration issues, is among the most widespread interest of the pedagogical practices. It has received much attention in the twenty first century and been investigated through the employment of varied research methods in pertinence to the promotion of assorted skills in many disciplines. PBL has been exploited to develop students' creativity in Science, Technology, Engineering, Arts, and Mathematics (STEAM) education through a quasi-experimental design (Cheng et al., 2022), motivation and engagement in learning activities using surveys (Hira & Anderson, 2021), students achievement in learning economics applying an experiment (Maros et al., 2021), collaboration skills in engineering education with a qualitative analysis (Hussein, 2021), the exchange of information and content through online spaces, participation, and collaboration in mathematics through a cross-sectional study (Hossein-Mohand

et al., 2021), and English writing skills and students' learning initiative in English language learning applying research and development of ADDIE steps (Lu, 2021). The assorted skills, subjects of interest and research methods for and in which PBL is engaged validate its potential for more specific language skills like English pronunciation.

It is generally accepted that pronunciation is one of the most prominent aspects in spoken English language teaching and learning. The features of one spelling-different sounds and one sound-different spellings are just one of the factors that appeals to diverse studies. English pronunciation is investigated in terms of assessment and learning in English as a Foreign Language (EFL) contexts by making use of Automatic Speech Recognition (ASR) (Xiao & Park, 2021), of teaching effectiveness by adopting SPOC-based flipped classroom English Education students (Xue & Dunham, 2021), of didactic activities through Computer-Assisted Pronunciation Teaching (CAPT) (Pourhosein Gilakjani & Rahimy, 2020); English Pronunciation app (Haryadi, S & Aprianoto, 2020); and an online pronunciation Voki (Bellés-Calvera & Bellés-Fortunõ, 2018), of creating a computer-aided English pronunciation training by exploiting audiovisual fusion method (Liang & Shang, 2021), and self-taught actions through Automatic Speech Recognition (ASR) (Liu et al., 2019); of assessment facilitation by designing the online teaching effect test system (Shen, 2018). The studies of English pronunciation over the last three years focus on the adoption of Web technologies in the pedagogical activities that enable learners regulate their own learning.

Self-Regulated/Directed Learning (SDL/SGL) or autodidacticism is recognized as being widely considered to be the most substantial learning process in 21st Century pedagogy. This entices the researchers to carry out studies about students' speaking skills and self-directed learning in a virtual English (Azizah SBH & Susanti, 2021), autodidacticism and its relevance in lifelong learning and adult education (Mayende Kiwelu & Ogbonna, 2020), self-taught musicians and formally trained counterparts in exhibiting auditory enhancements (Zendel & Alexander, 2020), the effects of CELL curriculum participation on learning flow, learning motivation, academic self-efficacy, and self-directed learning ability (Yang et al., 2020), a project-based embedded systems course and self-directed learning (Larson et al., 2020), the effects of project-based learning on students' self-directed learning skills in educational technology (Bagheri et al., 2020), the designing of a self-directed, self-paced e-learning module for nursing students for paediatric simulation (Logan et al., 2021).

Project-based learning and autodidacticism will inevitably be instrumental aspects that are required in education and discover their land to considerably grow in the digitally networked world. PBL is one of the Key Performance Indicator for Indonesian Universities (Kemendikbud, 2021) and that of SDL as the key to new skills and knowledge (Melkonian, 2022). Despite the numerous enthusiasms on PBL and SDL, no study to the best of our knowledge has explored the enhancement of autodidacticism-infused English pronunciation through scaffolding assignments of project-based learning.

This study differs from those in the previous areas on scaffolding assignments, project-based learning, English pronunciation, and autodidacticism. It does not directly concern the employment of scaffolding assignments to promote a certain English language skill—English pronunciation, nor the SDL. It is neither pertinent to the exploitation of PBL for English pronunciation per se. It deals with the infusion of scaffolding assignments to alleviate the reluctance of adopting project-based learning due to the apprehensiveness to the students' incomplete exploration of the subject matters. It encourages students to explore the subject matters by completing the scaffolding assignments as the requirements to conduct the project on

developing their English pronunciation and in so doing, students cultivate their self-directed learning skills.

Of the three purposes addressed in this study, the first is to design the scaffolding assignments to conciliate the hesitation in employing Project-Based Learning of English pronunciation and autodidacticism. The second aim is to describe the process of scaffolding assignment utilization to conciliate Project-Based Learning of English pronunciation and autodidacticism. To investigate whether the scaffolding assignment-infused Project-Based Learning enhances English pronunciation and autodidacticism is the last objective of the study.

Literature review

Scaffolding and project-based learning

Scaffolding is the process of learning and assignment arrangement through the decomposition of learning objectives into feasible stage with the lecturers' assistance (Skene & Fedko, 2014) or various sorts of aids prepared by teachers to assist learners grasp and engage with the lesson more challenging than their existing ability (Tedick & Lyster, 2019). The underpinning argument of scaffolding is Wood et al's notion that it allows a child or a beginner to make a solution to a problem, conduct an assignment or accomplish an objective beyond his capability (Wood et al., 1976). Scaffolding has been characterizing teacher-learner interaction ever since and regarded as an effective learning process (Tedick & Lyster, 2019). Scaffolding is essential in realizing the role of teacher as facilitator. It is to create condition and support students to learn through doing the project (Boss & Larmer, 2018)

Scaffolding comprises three categories in language teaching context, they are verbal, procedural and instructional scaffoldings (Tedick & Lyster, 2019). Verbal scaffolding is designed to encourage learners to produce the target language through questions, answers, and reasons. Procedural scaffolding aims at producing the language through a variety of activities based on pair work, peer work and group work. Instructional scaffolding is also purposed for the language production through comprehension which includes the support of various print and multi-media resources. The scaffolding assignments in this study are devised in the sense of the instructional scaffolding in which a series of assignments are prepared for learners to be completed and the completion of these assignments are requisite for their team-based project.

Team-based project is the legal term used in the ministerial decree of Indonesian universities key performance indicators for project-based learning. PBL is defined as "a systematic teaching method that engages students in learning knowledge and skills through an extended inquiry process structured around complex, authentic questions and carefully designed projects and tasks" (Markham et al., 2003). The word project is commonly mistakeable for a task or assignment, or project delivered after the completion of certain topics of a course or subject. The key difference is that PBL is not learning to do the project, it is learning through the project.

PBL is believed to have lasted for more than a century and to share similarities with action-based, experience-based, and perception-based learning and it was made known in language education in the 1960s and 1970s (Mohan, 2019). It continues to thrive as a preferred learning process for its varied benefits to promote the skills and mindset necessary to be successful lifelong learners in a variety of contexts (Brooks & Kerschen, 2022), the pre-service teachers' creative thinking (Yustina et al., 2020), students' critical and creative thinking skills (Sumarni & Kadarwati, 2020); (Anazifa & Djukri, 2017), teamwork (Sakulvirikitkul et al., 2020), student engagement through knowledge and information sharing and discussion (Almulla, 2020), affective learning outcomes, cognitive outcomes and behavioural outcomes (Guo et al., 2020), the students

skills of research and problem-solving (Burns, 2020), empathic abilities (Kim, 2020), student cognitive achievement (Santyasa et al., 2020), real world problem solving skills and group work (Nurbekova et al., 2020), student's creativity (Ummah et al., 2019), students' personal growth and learning (Nakada et al., 2017), and the freedom of self-learning, interaction and cooperation (Chatwattana & Nilsook, 2017).

It becomes evident that Project-Based Learning is gaining its popularity in pedagogical practice and studies. It places students as the centre in which they collaboratively do the projects under teacher facilitation (Hira & Anderson, 2021). In the interdisciplinary approach, PBL is used in three different study programmes of Applied Mathematics, Civil Engineering and Industrial & Engineering Management (MacLeod & van der Veen, 2020). It is the treatment of the experiment to decide its effect on students' academic achievement (C. H. Chen & Yang, 2019).

In designing a course with PBL, essential elements known as Gold Standard Project Based Learning must be taken into account, they are a challenging problem or question, sustained inquiry, authenticity, student voice and choice, reflection, critique and revision, and a public product (Larmer et al., 2015). These elements are the basis for the development of teaching using project which take the stages of designing and planning project, aligning the project to standards, building the culture, managing project activities, scaffolding student learning, engaging and coaching student performance. These stages are commenced with the project type selection of the five common kinds: solving a real-world problem, meeting a design challenge, exploring an abstract question, conducting an investigation, taking a position on an issue. All these aspects are put into practice through four phases of launching the project, building the competence, developing, and revising the products, and presenting the products.

PBL is not equally teacher free intervention. The room for lessons and materials, lectures, and direct instruction in a PBL class is open as an integral part. However, scaffolding is more preferable in facilitating the creation of the project products. The scaffolding begins by unloading the target products to resolve what knowledge, skills and attitudes are required to complete the products (Larmer et al., 2015).

Autodidacticism and English pronunciation learning

Etymologically, autodidacticism is made up of *autós* meaning self and *didaktikos* meaning teaching. Autodidacticism or autodidactism literally means self-education or self-learning and self-teaching and defined as education without the guidance of teachers (Scholarly Community Encyclopedia, 14 Oct 2022, https://encyclopedia.pub/entry/29265). It is studied in its relevance in lifelong learning (Mayende Kiwelu & Ogbonna, 2020); in recalibrating the visions of the "new learner of tomorrow", the connected, creative, autonomous, coding, motivated and making digital learner (Sefton-Green, 2019); in determining whether self-taught musicians impacts auditory processing abilities in musical tasks compared to formally trained musicians, (Zendel & Alexander, 2020); and in its relation to Mistral's view of the reading process as formation of a reader-as-creator, (Araya, 2019); and in the transformation from patterning education to autodidacticism of ideological and political education, (Wen, 2017).

Initially, autodidacticism is used in a non-schooled context as it is associated with the word autodidact, a self-taught individual without any formal teacher and education. It implies an individual's pursuit of learning in non-institutional settings (Roberson, 2005). In teaching and learning sphere, autodidacticism is known as autodidactic learning which is pertinent to adult learning or andragogy and develops into self-directed learning or self-managed learning or self-regulated learning which is associated with heutagogy. By definition, Self-Directed Learning

(SDL) is a process in which learners directs the learning of a subject as well as the 21st century competence of cognitive intrapersonal and interpersonal domains (van Zyl & Mentz, 2021); a process where learners initiate diagnosing the learning needs, formulating the learning goals, and identifying learning resources (Parker, J. E., & Williamson-Leadley, S. L. (2023); a theory of adult learning with the freedom of learners to create their learning experiences (Sharpe, R. T., & Kelley, T. L. (2014). SDL is generally associated with learning process by definition but is also viewed as an ability or skill.

In this sense of SDL as skills, the term self-directed learners is used and this finds its place in outcome-based education which emphasizes on what capabilities the students are expected to have. Self-directed learners have the characteristics of setting clear learning goals for themselves, shaping their learning process in line with goals and plans, monitoring their own learning process, evaluating the outcomes of their own learning, autonomous, having self-motivation, open to learning, curious, willing to learn, valuing learning, having self-control, and taking initiative to learn (Knowles, 1975; Jennett, 1992; Brockett and Hiemstra, 1991). These components can be categorized into motivation, self-control, self-monitoring, and self-confidence (Tekkol, İ. A., & Demirel, M., 2018).

Self-Directed Learning has been widely investigated in various angles and contexts. SDL is investigated in the context of project-based learning by integrating into project-based learning to make a self-directed project- based learning approach as one of the four principles in designing learner-centred instruction and assessment (Aslan et al., 2014) and to make self-directed project-based learning task (Kershaw et al., 2017), determining the link between self directed learning readiness and project-based learning outcomes (Stewart, 2007), and utilizing self-directed approach for project based learning activity (Chew et al., 2019). As an ability, SDL can be promoted through Computer Enhanced Language Learning (CELL) curriculum (Yang et al., 2020), the learning ecosystem of a project-based embedded systems course (Larson et al., 2020), and project-based learning strategy (Bagheri et al., 2020). Self-directed learning (SDL) is also considered positively impactful on the promotion of other competences like innovativeness (Lemmetty, 2021) and language learning strategies (Hawkins, 2018).

In the context of English language teaching and learning, SDL has been practised for years. The use of videos in self-directed learning English class is empirically influential on the progression of oral skills (Fu & Yang, 2019). However, the studies of SDL in specific pertinence to English pronunciation is not massively identified. English pronunciation is special aspect of language teaching requiring special didactic treatment.

English pronunciation teaching and learning in the last decades are technologically infused. ASR-based computer-assisted pronunciation training (CAPT) significantly influential to EFL learners' speaking skills (Hsu, 2016). Sounds and Pronounce Interactive Software (SPISE) for English promotes self-directed learning and students' English phonetics (Ibrahim et al., 2019). The sociocultural approach positioning teacher as a facilitator and supporter of students' self-directed learning significantly promotes pronunciation in the EFL classroom (Lennon, 2020). Game is believed to potentially compensate inadequate facilities for English pronunciation learning (Trooster et al., 2017).

Self-Directed Learning as a didactic strategy in English pronunciation involves assorted aspects. The integration of Speech Recognition System (SRS) based on Reading Assistant importantly affects students' independent study and individual knowledge in the construction of English pronunciation (Li, 2018). Self exercises of transcribing the pronunciations of English words into phonetic transcription with locally-appropriate readability and accessibility using

Phonetic Alphabets for Bahasa Indonesia (PABI) is helpful in pronouncing English consonant phonemes, vowel phonemes, and cluster sounds (Karlina et al., 2020). Other studies of English pronunciation teaching and learning include the aspects of purposes and elements.

The issues of international or global Englishes and intelligible English transform the aim of English teaching. Core or standardized styles of English or native-like English are no longer the intended or target English learning outcome, especially in the area of English pronunciation. The aim of pronunciation instruction is not native-like English pronunciation, but intelligible one (Gilakjani, 2017). The goals for pronunciation teaching have shifted from accent-free or native-like pronunciation to comprehensibility and it indicates that a teacher's good theoretical background can raise students' awareness and the overall performance of pronunciation phenomena, whether at the segmental or the suprasegmental level (Vančová, 2019). Despite this transformed purpose, the elements of English pronunciation instruction remain the same. English pronunciation improvement encompasses various components such as monophthongs, diphthongs, triphthongs, semi-vowels, consonants, consonant cluster sounds, strong and weak forms, linking phonemes, syllable stresses, word stresses, sentence stresses, rhythm, pitch and intonation (Sugiarto et al., 2020), the areas of inconsistency in English pronunciation occur in same letter different sounds and same sound different letters (Ambalegin & Arianto, 2019), English connected speech processes such as elision and assimilation (Kuzminykh, I. A., & Khoroshilova, S. P. (2017).

English pronunciation instruction is also examined in relation to the instructional process. It is viewed as subordinate element by Iranian teachers as it lacks of motivation, resources, materials, and educational facilities like computer technologies prevented teachers from teaching pronunciation (Pourhosein Gilakjani & Sabouri, 2016). A computer assisted teaching tool and extrinsic motivation is found fruitful in English pronunciation class (Hermans et al., 2017). English pronunciation is interfered by the students' first language (Sundanese) like the difficulties to distinguish certain sounds of vowels such as between /e/ in 'beg' and /æ/ in 'bag', /ei/ in 'wait' and /e/ in 'wet', the main factors that cause the errors are internal factors (lack of practice, lack of self-confidence, and lack of exposure) and the external factors (the differences pronunciation between the students' L1 and L2, and the types of English pronunciation errors made by the students in vowels sound were: long and short vowels, diphthongs, and triphthongs (Octaviana, 2019). English pronunciation is studied to identify the factors that affect Indonesian students in learning pronunciation using a questionnaire to identify the factors and a qualitative method using observation, records, and note-taking to identify the problems in learning pronunciation and the factors influencing the students' pronunciation accuracy and it is found that native language interference, phonological awareness, pronunciation instruction, corrective feedback, and the response students gave to achieve their goal are the factors (Kosasih, 2021).

English pronunciation is developed through diverse methods of instruction. The adoption of speech signal processing technology using different forms of information and promote multi-form communication between teachers and students, and between students and students combined with multimedia teaching resources such as text and video helps stimulate students' interest in learning English and improve the overall teaching level of English pronunciation (Ma & Lei, 2020). English pronunciation is developed by using computer in (Pourhosein Gilakjani & Sabouri, 2017), watching YouTube in English and using google voice application (Yusriati & Hasibuan, 2019), using corpus assists and Praat to visually demonstrate spectrogram of similarities and differences between English and native language that is useful in stimulating teachers and learners to study pronunciation (Cao, 2016), watching video or listening to English expressions containing elements of English pronunciation difficult to them, drillings the elements, recording and

transcribing their utterances, and comparing the transcriptions with those of native speakers' (Pardede, 2018; Alek, & Nguyen, 2023), applying project-based learning (Remache Carrillo et al., 2019), using a corpus-based pronunciation learning system (H. C. Chen & Wang, 2016), employing computer-assisted pronunciation training (CAPT) with automatic speech recognition (ASR) (Cucchiarini et al., 2012), genre-based approach to promote oral communication in English classes (Silva, M. O., & Da Silva Guerra, D. C. (2020)(Silva & Da Silva Guerra, 2020), utilizing interactive and input-output processing audio clip (Santhoshi, 2021), and highlighting more on quality-of-pronunciation features than on quantity-of-phonation features (Shen, Y., Yasukagawa, A., Saito, D., Minematsu, N., & Saito, K. (2021).

Autodidacticism as the basis of self-directed learning considered as a process as well as a skill is widely recognized in the teaching and learning of many spheres including English pronunciation. It effectively works with project-based learning as the leading learning method of digital era and PBL, on the other hand, is believed to potentially stimulate SDL ability. Integrating SDL skill in the English pronunciation instruction through scaffolding assignments in a project-based learning is presumably rewarding learning experience. This can be illustrated in the conceptual framework below.

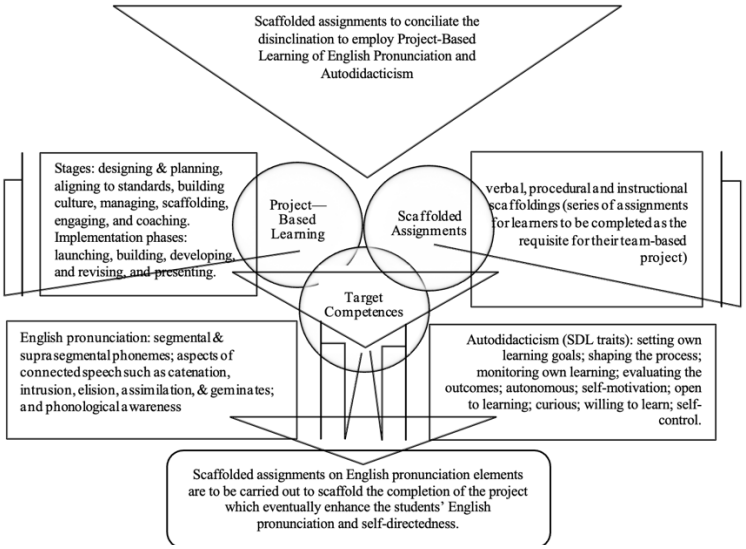

Figure 1. Conceptual framework of promoting English pronunciation and autodidacticism through scaffolding assignments in project-based learning

Presumably, SDL is inseparable from project-based learning. Project-based learning is characterized by the application of knowledge, management of resources, and self-directed learning (Eickholt et al., 2019). PBL facilitates student satisfaction towards the learning process (Garnjost & Lawter, 2019) and a project-based flipped learning model at universities strengthen self-directed learning ability, self-leadership, and learning competency (Kan et al., 2016). To support the process of project completion in PBL, scaffolding assignments are provided. These assignments are learning module-like in which students are encouraged to complete the assignments through the exploration of the related learning resources. This usage of learning module in PBK is proven to be effective to boost students engagement in their own learning (Logan et al., 2021). The assignments are presented, processed, and submitted in a learning management

system and it is expected that this could cultivate autodidacticim. Technology-driven environment influences the self-directed learning skills (Nizhenkovska et al., 2020).

Research method

Design-based research or DBR is employed in the study and conducted through iterative process of analysis, design, development, and implementation, and evaluation. In the analysis, design, and development processes, library research is adopted to make necessary preparation regarding English pronunciation, autodidacticism, SDL, and PBL. The utilization of PBL and the assessment of its effectiveness are put into implementation and evaluation processes. The study was carried out in three semesters—semester 115 in 2021, semester 117 in 2022, and semester 119 in 2023—and students taking English Phonetics and Phonology (EPP) course in Universitas Negeri Jakarta were the subjects of the study as well as the data sources.

Data required to construct the scaffolding assignments on English pronunciation, the scenario of the project-based learning, and the assessment of autodidacticism are the key related points from the relevant sources. Data to describe the process of teaching and learning are sourced from the EPP course plan and the student weekly progress reports. The scores of English pronunciation and autodidacticism or SDL skills are the data to determine whether or not the scaffolding assignments in the PBL conducively advocate English pronunciation and SDL skills. Assorted sources on scaffolding, English pronunciation, SDL including standard SDL ability scale, and PBL are utilized to meet the construct and content validity. Questionnaire is administered to collect the data on SDL skills and oral test of English pronunciation with pre-and post-test design is applied to measure the improvement of English pronunciation.

Results

The results of the study are outlined in terms of the design of the scaffolding assignments to conciliate the disinclination to employ Project-Based Learning of English pronunciation and autodidacticism, the employment of Project-Based Learning of English pronunciation and autodidacticism, and the effect of employing Project-Based Learning with scaffolding assignments on English pronunciation and Self-Directed Learning Skills. To design the assignments, the subjects matters of the course (English Phonetics and Phonology/EPP) and the pertinent literature of scaffolding, project-based learning, autodidacticism, and English pronunciation are analysed for the bases of devising and producing the scaffolding assignments on English pronunciation and the scenario of the project-based learning and auto didacticsm. This is conducted in the analysis and development phases of Design-Based Research. The employment of the PBL is in the implementation phase focusing on the execution of PBL through the stages of launching the project, building the competence, developing and revising the products, and presenting the products. The measurement on the effect of the employment on English pronunciation skills and SDL skills is carried out in the evaluation phase.

The scaffolding assignment design of EPP course

The EPP scaffolding assignments are commenced devising by designating the intended learning outcomes of the EPP course (CLO) which are then dissected into sub-course learning outcomes. These sub-CLOs drive the decision of the course subject matters required for the completion of the project. The nature of the subject matters which cover knowledge, skills, and attitudes hints that instructional scaffolding aiming at language production through comprehension is advocated. The instructional scaffolding assignments are composed in such a way to

accommodate autodidacticism (SDL traits)—setting own learning goals, shaping the process, monitoring own learning, evaluating the outcomes, self-motivation, open to learning, curious, willing to learn, and self-control.

The construction of the assignments is made up of seven parts, which are CLO, name, ILO/sub-CLO, directions, schedule, subject matters, and tasks. There are five CLOs indicating what students should be able to do by the end of the course and six names implying the six assignments or scenes. The term scene is opted to compatibly contextualize the assignments in the scenario of the Project-Based Learning. The design is presented in the table below.

Table 1. The design of the scaffolding assignments to conciliate the disinclination to employ project-based learning of English pronunciation and autodidacticism in EPP class.

Course: English Phonetics and Phonology		
Course Learning Outcomes (CLO): By the end of the course, students are able to: 1) demonstrate the knowledge on the conceptual aspects of phonetics and phonology and its relation to oral reception and production activities; 2) to distinguish and produce unfamiliar English sounds; 3) to demonstrate the understanding/ mastery of the processes of production English sounds; 4) to perceive and resolve a continuous stream of English sound into a meaningful structured string of phonological elements; 5) to distinguish and produce prosodic patterns.		
Activities	Contents	Purposes
1. First Date	Pronouncing English words, sentences, and sentences with: vowels, diphthongs, triphthongs, consonants, consonant clusters, stress in different positions, different intonation, the assimilated sounds, elided/omitted sounds, the linked/catenated sounds, the neutralized sounds, and with weak forms	to profile the students' English pronunciation before the project
2. Assignments/Scenes		
2.1. Assignment/Scene 1		
2.1.1. Name	Entering the world of English sounds	
2.1.2. ILOs/sub-CLOs	Ability to judge the relationship of phonetics-phonology, linguistics and pronunciation and select the English sounds distribution	
2.1.3. Directions	Describe EPP: the sub-fields, the interrelations to phonemes, pronunciation and spoken language and select the English sounds distribution	
2.1.4. Schedule	Week 3-4	
2.1.5. Subject matters	Field and sub-fields of phonetics; interrelations between phonetics and phonology, pronunciation and spoken language, and phonetics and phonemes; English vowels, diphthongs, triphthongs, consonants, consonant clusters and their distributions	
2.1.6. Tasks	Five tasks of filling in the spaces/columns with the relevant information on the subject matters using the sources/references of the students' preferences	
2.2. Assignment/Scene 2		
2.2.1. Name	Writing the speech sounds	
2.2.2. ILOs/sub-CLOs	Ability to use English-English dictionaries with phonetic alphabets of IPA to pronounce English words of Received Pronunciation	
2.2.3. Directions	Transcribe a short tale phonetically and phonemically, rewrite a short tale based on the phonetic transcription of the tale, record your telling the two tales, and select English words of minimal pairs	
2.2.4. Schedule	Week 5-6	
2.2.5. Subject matters	Phonemes, speech sounds, minimal pairs, and allophones; phonetic and phonemic transcriptions	

2.2.6. Tasks	Two tasks of filling in the spaces/columns with the relevant data on the subject matters using the sources/references of the students' preferences
2.3. Assignment/Scene 3	
2.3.1. Name	Unveiling the nature of English spellings and sounds
2.3.2. ILOs/sub-CLOs	Ability to select English words unveiling the cases of one spelling-different sounds and of one sound-different spellings.
2.3.3. Directions	Find and collect as many as examples of the cases of one spelling-different sounds and of one sound-different spellings.
2.3.4. Schedule	Week 7-8
2.3.5. Subject matters	Sound & spelling principles in relation to pronunciation (one spelling-different sounds and one sound- different spellings)
2.3.6. Tasks	Two tasks of filling in the spaces/columns with the relevant data of English words with the cases of one spelling-different sounds & of one sound-different spellings using the sources of the students' preferences
2.4. Assignment/Scene 4	
2.4.1. Name	Enter the chamber of phonetics: producing sounds using organs of speech
2.4.2. ILOs/sub-CLOs	Ability to demonstrate the knowledge on speech sound production and its pertinence to sound categorization and to produce English vowels and consonants
2.4.3. Directions	identify the names of the organs involved in speech sound production; exemplify the three groups of speech sound categorization; and describe the production of English vowels and consonants based on their elements/criteria
2.1.4. Schedule	Week 9-11
2.4.5. Subject matters	the speech organs, sound categorization, and the elements/criteria in the production of English vowels and consonants
2.4.6. Tasks	Seven tasks of filling in the spaces/columns with the relevant information on the subject matters using the sources/references of the students' preferences
2.5. Assignment/Scene 5	
2.5.1. Name	Entering the suprasegmental phonemes
2.5.2. ILOs/sub-CLOs	Ability to perceive and produce segmental and suprasegmental phonemes and their variations in English pronunciation
2.5.3. Directions	Complete the table on pitch, stress, juncture, and intonation; analyse the syllable structures of words; complete the analysis table on the variations of phonemes
2.5.4. Schedule	Week 12-13
2.5.5. Subject matters	the suprasegmental phonemes of pitch, stress, juncture, and intonation; thesyllable structure for stress placement; the variations of phonemes: 1) allophones in English; 2) three hypotheses of English plural '-s' endings; 3) three hypotheses of English past '-ed' endings; 4) dark and light / l /; 5) rhotic and non-rhotic /r/; 6) weak and strong forms
2.5.6. Tasks	Three tasks of filling in the spaces/columns with the relevant data and information on the subject matters using the sources/references of the students' preferences
2.6. Assignment/Scene 6	
2.6.1. Name	Exploring the dynamism of sounds in speech
2.6.2. ILOs/sub-CLOs	Ability to perceive and pronounce aspects of connected speech in English pronunciation
2.6.3. Directions	Exemplify the pertinent aspects of linking, elision, neutralization, and assimilation
2.6.4. Schedule	Week 14

2.6.5. Subject matters	The connected speech aspects of linking, elision, neutralization, and assimilation	
2.6.6. Tasks	One task of filling in the spaces/columns with the relevant information on the subject matters using the sources/references of the students' preferences	
3. Final Date	Pronouncing English words, sentences, and sentences with: vowels, diphthongs, triphthongs, consonants, consonant clusters, stress in different positions, different intonation, the assimilated sounds, elided/omitted sounds, the linked/catenated sounds, the neutralized sounds, and with weak forms	to profile the students' English pronunciation after the project

The ultimate goal of the EPP course is to promote students' English pronunciation through the comprehension of the articulatory phonetics conception as the bases for the pronunciation trainings. This sets the phonetics and phonology as the procedural knowledge the mastery of which is demonstrated through the ability to pronounce the English phonemes and its aspects of connected speech. Therefore, the names and the intended learning outcomes are orientated towards the English pronunciation promotion. This is also evident in the formulation of the directions which dictate to the process of gaining the phonetics & phonology-pertinent procedural knowledge and of exploring and selecting the real English uses of the knowledge.

The assignments are arranged to be accomplished within fourteen weeks. The deadlines are set for each assignment, yet the students may negotiate for newly rearranged deadlines when reasonable. This negotiation is accounted shaping the learning process and self control which are evidence of autodidacticism. The schedule for each assignment is organized to adjust with the coverage of the subject matters which are cultivated from the outcomes. The subject matters are hardly provided, only the hints of key words, in order to encourage students' self exploration to the sources of information where they potentially improve the learning skills and digital literacy through locating, evaluating, using, and communicating information. This is also expected to enhance their communication skill when consulting their lecturers during the completion of the assignments.

Integrated in the assignment is the pronunciation activities of English words, phrases, and sentences pinpointing the key aspects of English pronunciation. These aspects are vowels, diphthongs, triphthongs, consonants, consonant clusters, stress in different positions of words, different intonation in sentences, the assimilated sounds, elided/omitted sounds, the linked/catenated sounds, the neutralized sounds, and weak forms. The activities are administered twice, at the beginning and at the end of the course, sequentially termed as first date and final date. They are employed to produce the students English pronunciation profiles before and after the project execution which are parts of determinant indications for the pronunciation enhancement.

The employment of project-based learning with scaffolding assignments of EPP

By design of the Gold Standard Project Based Learning, indispensable principles must be encompassed. Those principles are a challenging problem or question, sustained inquiry, authenticity, student voice and choice, reflection, critique and revision, and a public product. They characterize the stages of developing PBL consisting of designing and planning project, aligning the project to standards, building the culture, managing project activities, scaffolding student learning, engaging and coaching student performance.

Beside the fundamentals and stages, the other two aspects to take into account are the project path and types. The project path is launching the project, building the competence, developing and revising the products, and presenting the products and that of the kinds are solving

a real-world problem, meeting a design challenge, exploring an abstract question, conducting an investigation, taking a position on an issue. These four aspects are conscientiously incorporated in the PBL with scaffolding assignments as shown in the following figure.

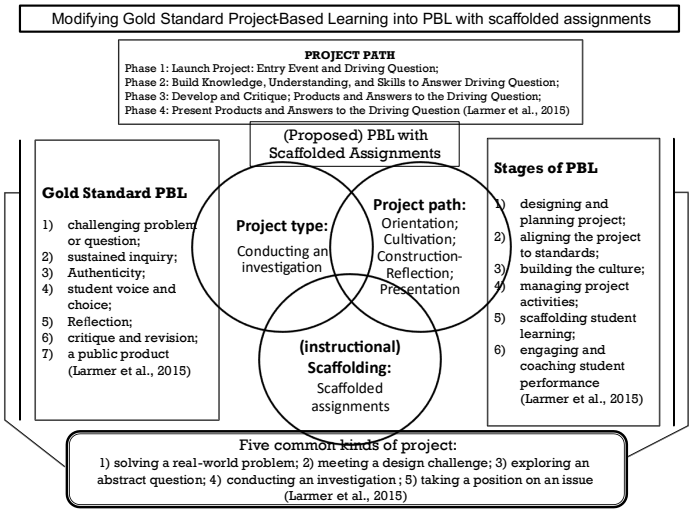

Figure 2. Incorporating PBL gold standard principles, stages, path, and types into PBL with scaffolding assignments

The PBL gold standard, the stages, and the path are thoroughly infused in the proposed project path which is adjusted into orientation, action, reflection, and presentation. The orientation covers the first phase of launching the project as the entry event in which the driving question is disclosed. Action is the stage where the second phase of building knowledge, understanding, and skills to answer the driving question is facilitated. The third phase in which the project products and answers to the driving question are developed and examined is contained in the reflection stage. The final stage of presentation holds the fourth phase of presenting the products and answers to the driving question. The exhaustive process of executing the stages is presented below.

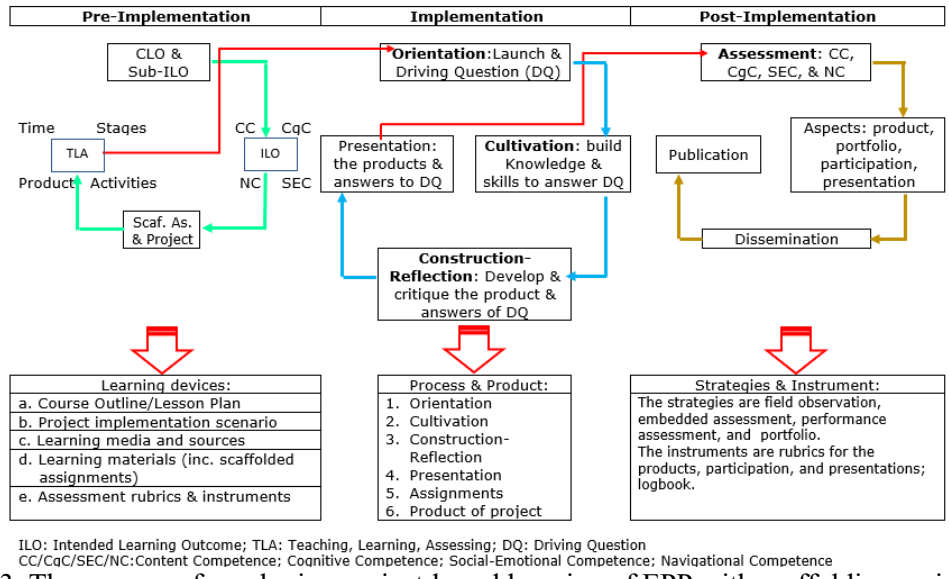

Figure 3. The process of employing project-based learning of EPP with scaffolding assignments

The PBL with scaffolding assignments is engaged with Pre-Implementation state, the first of the three states before Implementation and Post-Implementation. The scaffolding assignments of EPP as a part of learning materials and PBL implementation scenario are prepared here. The assignments and scenario are applied in the implementation level in which the EPP project is released, worked out, reviewed, and scrutinized. The students are allowed to opt the learning modes, whether in classroom or virtual room. In Post-Implementation stage, the EPP intended learning outcomes and add-on SDL skills are assessed and the product of the project is disseminated and/or published. In the following is how the utilization of the PBL with scaffolding assignments is operated stage by stage.

Table 2. The utilization of project-based learning with the scaffolding assignments of English pronunciation in EPP class.

Stages	Activities
1. Orientation	1) Revealing the Project of EPP course in a face-to-face meeting. The project is named ”EPP for internationally acknowledged English pronunciation”. 2) Releasing the *driving question*”How is the process of promoting your English pronunciation using scaffolding assignments of exploring the essential English Phonetics and Phonology fundamentals?” 3) Announcing the type of the project which is ‘conducting an investigation’, a mini research employing narrative inquiry method of qualitative research. The format of the project report is also revealed and it is a research article with the structure of Introduction, Method, Result, and Discussion (IMRD); 4) Displaying the outputs of the project, they are: 1) an individual terms of reference to carry out the project; 2) all tasks in scene one until scene six; 3) weekly progress report in the *log* book; 3) Ppt slides of product presentation; 4) the recording of the presentation; 5) the final product of research project report in the form of research article; 5) Presenting the required knowledge and skills to conduct the research, which are: the position of phonetics and phonology in linguistics; 2) phonetics branches; 3) phonetics vs phonology and phonemes vs sounds; 4) the relevance of pronunciation and spoken language; the relation between speech sounds, spelling in pronunciation; 5) international phonetic alphabets of IPA and English sounds of RP; 6) vowels, diphthongs, triphthongs, consonants, and consonant cluster; 7) standardized phonetics alphabets in English-English dictionaries to guide English pronunciation; 8) the cases of sound-spelling principles in relation to pronunciation—one sound-different spellings and one spelling-different sounds; 9) the sound distribution in words and phonetic and phonemic; 10) transcriptions the general sequential process of speech sound production by organs of speech; 11) sound categorization based on vocal cord vibration, whether or not air is restricted, and where air goes through; 12) the production of English vowels and consonants; 13) syllable structures of words; pitch, stress, juncture, and intonation; 14) three hypotheses of English plural ‘-s’ endings and of past ‘-ed’ endings; 15) weak and strong forms; the allophones; 16) phonemic variations and phonetic-phonemic differences; 17) linked and assimilated sounds in connected speeches; 18) sentences with appropriate neutralized and omitted sounds in connected speeches; 19) contracted forms and tongue twisters; 20) writing the introduction, method, result, and discussion of a

	research article on the process of studying English phonetics and phonology in relation to English pronunciation 6) Highlighting the timeline*
2. Cultivation	Facilitating students to build information (knowledge), skills, and values pertinent to the completion of the project through the learning activities like consultations, discussions, and lectures in the learning modes of face to face/onsite, online, and hybrid learning. The scaffolding assignments are provided for the cultivation of the required knowledge, skills, and values. Social media such as *Zoom*, *Whatsapp* atau *Google Classroom* are utilized to support the learning activities.
3. Construction-Reflection	1. Constructing the project, a mini research of answering the Driving Question in the form of powerpoint slides and research report. During the project construction, the cultivation of the required competence also takes place; 2. Administering self and peer assessments as part of the reflection and of the notion that assessment is as learning in the process of writing the mini-research report—the research article.
4. Presentation	Presenting the answer of the Driving Question in the form of powerpoint slides and research artice—the resesarch report.

*The timeline

No	Stages & Outputs	Week	Details
1	Orientation	W1	Launching the project (Driving Questions: briefing & QA Session)
2	Cultivation & Construction-Reflection (consecutive or concomittant):	W2-14	Building knowledge, understanding, and skills to answer the driving question through the completion of the tasks in the six scenes or assignments.
	1) Project ToR	W2	Planning own learning in terms of time, stages, mechanism & strategy, etc.
	2) Scene 1	W3-4	
	3) Scene 2	W5-6	• Completing all the assignments or scenes in order to get to the answer of DQ which is put later into a reasearch article through exploring the related literature, group discussion, consultation with lecturer, lectures on demands, self & peer assessment, etc.
	4) Scene 3	W7-8	
	5) Scene 4	W9-11	
	6) Scene 5	W12-13	
	7) Scene 6	W14	
	8) Article of mini-research report	W16	• Constructing and examining the project part by part (introduction, method, result and discussion). Self and peer-assessment are employed in the process of writing the mini-research report
4	Presentation	W15-16	Presenting the article resulted from the preocess of answering the DQ
5	Dissemination	W16	Refining and disseminating the article

The Project-Based Learning with scaffolding assignments of English Phonetics and Phonology is regulated in three stages of Pre-Implementation, Implementation, and Post-Implementation. In Pre-Implementation, the instructional scaffolding assignments of EPP-based knowledge and skills required in English pronunciation and the conducting an investigation project of a mini-research on the process of promoting one's own English pronunciation are set. The states of orientation, cultivation, construction-reflection, and presentation are exploited in the Implementation stage and that of dissemination is in the post implementation stage. The Implementation and Post-Implementation stages are devised to be accomplished in sixteen weeks in which the students are aided to carry out a mini-research on their lived experiences of promoting

the English pronunciation using a narrative inquiry method and to report the research in a research article.

Students' attitudes and the effect of project-based learning with scaffolding assignments towards the enhancement of English pronunciation in EPP course

The research subjects are a hundred one English Education Study Programs students having attended English Phonetics and Phonology class. They are classified in four groups assigned in semester 115 in 2021, 117 in 2022, and 119 in 2023. Working in a group of three or four, they work together developing the project through the stages. To get them exposed to the required knowledge and skills to do the project, they are scheduled to accomplish the scaffolding assignments.

The assignments are devised to guide the students to explore the related information individually or in groups. There are tasks specifically aimed at getting them delved into exceptional knowledge and know how of authentic aspects on English pronunciation such as phonetic symbols, one spelling-different sounds or one spund-different spellings, sound categorizations, distributions, and productions. They are also directed to practise and train their English pronunciation through recording their own pronunciation of sounds, prosodic features, and aspects of connected speech. These are presumed to help the students improve their English pronunciation. The data below show the students' attitudes towards the utilization of the scaffolding assignments.

Table 3. Students' attitudes towards the helpfulness of scaffolding assignments

No.	Scaffolded Assignments	Do the tasks help you pronounce English phonemes?																	
		G1-2021		% G1-2021		G2-2022		% G2-2022		G3-2022		% G3-2022		G4-2023		%G4-2023		% total	
		Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
I	Task 1.1: vowels & distributions	23	2	92	8	23	2	92	8	24	1	96	4	25	1	96	4	94	6
	Task 1.2: diphthongs & distribution	24	1	96	4	22	3	88	12	24	1	96	4	24	2	92	8	93	7
	Task 1.3: triphthongs & distribution	23	2	92	8	24	1	96	4	24	1	96	4	25	1	96	4	95	5
	Task 1.4: consonants & distribution	19	6	76	24	19	6	76	24	20	5	80	20	21	5	81	19	78	22
	Task 1.5: consonants cluster distribution	22	3	88	12	24	1	96	4	23	2	92	8	23	3	88	12	91	9
II	Task 2.1: one spelling-diff. sounds	24	1	96	4	24	1	96	4	24	1	96	4	24	2	92	8	95	5
	Task 2.2: one sound- diff. spellings	24	1	96	4	24	1	96	4	24	1	96	4	23	3	88	12	94	6
III	Task 3.1: phonetic/phonemic trans.	21	4	84	16	23	2	92	8	22	3	88	12	23	3	88	12	88	12
	Task 3.2: short tales in transcription	22	3	88	12	20	5	80	20	21	4	84	16	24	2	92	8	86	14
	Task 3.3: minimal pairs	19	6	76	24	20	5	80	20	16	9	64	36	22	4	85	15	76	24
IV	Task 4.1: the organs of speech	20	5	80	20	22	3	88	12	21	4	84	16	23	3	88	12	85	15
	Task 4.2: three groups of sound	22	3	88	12	20	5	80	20	21	4	84	16	22	4	85	15	84	16
	Task 4.3: vowel production	23	2	92	8	23	2	92	8	24	1	96	4	24	2	92	8	93	7
	Task 4.4: consonant production	24	1	96	4	23	2	92	8	24	1	96	4	23	3	88	12	93	7
	Task 4.5: voiced and voiceless	25	0	100	0	24	1	96	4	24	1	96	4	25	1	96	4	97	3
	Task 4.6: places of articulation	24	1	96	4	22	3	88	12	23	2	92	8	22	4	85	15	90	10
	Task 4.7: manners of articulation	23	2	92	8	23	2	92	8	24	1	96	4	23	3	88	12	92	8
V	Task 5.1: suprasegmental phoneme	22	3	88	12	22	3	88	12	20	5	80	20	21	5	81	19	84	16
	Task 5.2: the syllable structures	24	1	96	4	24	1	96	4	23	2	92	8	24	2	92	8	94	6
	Task 5.3: variations of phonemes	24	1	96	4	21	4	84	16	23	2	92	8	23	3	88	12	90	10
VI	Task 6.1: linking, elision, neutralization, and assimilation	22	3	88	12	22	3	88	12	21	4	84	16	22	4	85	15	86	14
	Total Tasks are 21	474	51	90	10	469	56	89	11	470	55	90	10	486	60	89	11	89,5	10,5

Information: Y: Yes; N: No

The students in four groups have positive attitudes towards the use of the assignments. Of twenty one tasks in six assignments, most of them (eighty nine point five percent) are considered helpful in increasing the students' English pronunciation and very few of the assignments are interpreted not helpful (ten point five percent). Only two tasks on the exploration of consonant distribution and minimal pairs are believed to be not advantageous by twenty percent of the students. Thirteen tasks are understood constructive by more than ninety percent of the students and six tasks are viewed supportive by more than eighty percent of them.

Among the four groups of the students, no contrasting difference is identified in relation to assuming the helpfulness of the assignments. The four groups see the assignments customarily valuable (eighty nine to ninety percent). Within the three years of practice in this study, the students' constant positive attitudes towards the assignments are maintained. This plausibly indicates the usefulness of the assignment to be part of the Project-Based Learning of English pronunciation in EPP course.

Project-Based Learning with the scaffolding assignments is empirically rewarding for the promotion of English pronunciation and Self-Directed Learning skills. Predominantly, based on the results of pre-test (seventy two point nine) and post-test (seventy eight point one), the students' English pronunciation is enhanced. Each of the four groups show the same tendency of increasing scores of post-tests compared to those of pre-tests. The average rise of the pre-test to post-test scores is five point two or about five percent. These quantitative data of the effect of PBL with scaffolding assignments are presented in the following table.

Table 4. The scores of English pronunciations by the four groups of EPP students in 2021, 2022, and 2023

Aspects	Group 1: 2021	Pre-test	Post-test	Group 2: 2022	Pre-test	Post-test	Group 3: 2022	Pre-test	Post-test	Group 4: 2023	Pre-test	Post-tes
Research Subjects (by initials of names)	RMY	78	83,35	NR	72	77	TP	75	84	ATA	71	76
	KE	60	62,05	NNS	78	83	NSL	78	85	MFR		
	ZAA	72	78,25	IVN	83	88	YKS	80	76	ZRM		
	CYR	71	79,6	GIMU	80	84	SN	75	82	IK	70	78
	TPA	70	73,55	HNM	75	78	RAM	70	77	AP		
	NPA	79	82,65	DDF	79	82	WM	64	68	AZ	74	81
	SAP	78	80,25	HN	75	76	TAM	77	81	PDH	77	81
	JRVH	61	62,1	FKD	72	76	SDA	72	79	ZZM	75	88
	MF	80	82	MDTA	87	89	YPL	77	82	MFR	71	75
	MKR	75	78,55	KKF	82	87	SAH	83	87	AR	83	86
	RFSP	72	72,15	GAS	72	79	WF	80	83	DW	72	78
	ARH	71	73,4	LJWS	73	77	SAB	82	88	NO	75	81
	CTW	62	62,1	ICP	85	89	SHZ	75	79	TWP	67	74
	TA			IS	80	83	RAAJ	71	78	HMMP	70	76
	RBBC	60	62	NF	70	76	OP	70	77	M	79	88
	SAK	61	62,8	MHI	81	86	MH	68	74	YPN	68	75
	AAPN	62	63,6	MFA	75	83	RA	78	84	ASHF	79	86
	AAN	63	64,4	MHAW	81	89	ZMZ	77	88	RAP	80	88
	DQG	63	65,2	KFF	83	89	RPA		43	AA	73	79
	INU	61	66	HKF	79	84	SW	69	76	VNA	69	77
	AA	60	66,8	MFA	80	83	MBVF	68	73	MKK	72	77
	ROR	64	67,6	ICN	75	79	SA	70	76	SSS	75	84
	DMH	65	68,4	MGK	77	82	RA	75	82	LMF	79	86
	IGNMM	63	69,2	GR	75	84	SN	73	78	SAA	74	76
	NA	70	70	LZ	76	83	SR	78	83	CM	76	76

	MDO	70	70,8						MFAP	83	86
									AAR	72	76
									HT	80	88
									LDW	77	81
∑ subjects in groups	26 (active: 25)			25			25			29 (active: 26)		
the lowest score		60	62	70	76	64	68			67	74
the highest score		80	83,35	87	89	83	88			83	88
x̄ group score		67,64	70,67	77,8	82,64	71,4	78,52			74,65	80,65
x̄ group pre-post score difference		-3,03 (pre-test > post-test)		-4,8 (pre-test > post-test)		-7,12 (pre-test > post-test)				-6,00 (pre-test > post-test)	
x̄∑pre-test	72,9 (of 101 active subjects)										
x̄∑post-test	78,1 (of 101 active subjects)										
x̄∑pre-post test score difference	-5,2 (post-test is higher than pre-test)										

The increased scores of the post-tests in each group are less than ten percent. Group 1's scores in 2021 shows three percent rise. The EPP students in 2022 which are settled in Group 2 and 3 unveil distinctive escalations of post-test scores that are four point eight and seven point one two. The subjects in Group 4 presents six percent of post-test score boost. The average increase of five point two or five percent is likely negligible, yet this is recognizable as the average score of the post-test is seventy eight which implies that twenty two percent of the English pronunciation aspects remain unaccomplished. These aspects are notoriously challenging for English learners, they are English prosodic features and connected speech.

The integral part of the PBL with scaffolding assignments in this study is Self-Directed Leaning Skills. These skills are measured using the modified instrument of Independent Studies: Readiness to Learn devised by Centre for Teaching Excellence, University of Waterloo (*Independent Studies: Readiness to Learn. Centre for Teaching Excellence, University of Waterloo.* https://uwaterloo.ca/centre-for-teaching-excellence/catalogs/tip-sheets/independent-studies-readiness-learn, 2023). The original version of the instrument is made up of twelve main indicators, they are Life skills, Independence, Basic skills, Information skills, Study skills, Learning to learn, Planning skills, Problem development skills, Analytical skills, Communication skills, Evaluation skills, and Completion skills. The indicators are then subdivided into fifty two sub-indicators or items which are employed to estimate the students attitudes towards and to self-evaluate the students' SDL skills. Administered at the end of the course, the evaluation reveals the following results.

The data of the EPP students' attitudes towards SDL skills demonstrate that they regard SDL skills as very important (seventy one percent) and fairly important (twenty seven percent). Only two percent of the students see the skills as not very important and unimportant. When the categories of very important and fairly important are segregated into agreeing and that of not very important and unimportant into disagreeing, it is displayed that the ninety two percent students agree that SDL skills are substantial and only two percent disagree or view the skills as unsubstantial.

Tabel 5. The EPP students' attitudes towards aspects for successful independent/autonomous learning and their self-evaluation of the SDL skills

No	Self-Directed Learning Skills	Skills (Percentage)				Attitudes (percentage)				Skills		Attitudes	
		Excellent	Good	Adequate	Poor	Very Important	Fairly Important	Not Very Important	Unimportant	High	Low	Agree	Disagree
1	Life skills: Organisation of time and resources in your life, co-operation in working with others, available support network	40,06	51,99	7,39	0,57	73,58	25,00	0,00	1,42	92,05	7,95	98,58	1,42
2	Independence: Autonomy, self-motivation, self-reliance, resourcefulness, initiative, and judgment	41,48	43,56	14,96	0,00	72,35	25,19	0,00	2,46	85,04	14,96	97,54	2,46
3	"Basic" skills: Literacy, numeracy, graphicity, computer literacy, etc.	42,80	45,96	10,35	0,88	61,11	33,59	0,88	4,42	88,76	11,24	94,70	5,30
4	Information skills: Ability to find information by: using libraries; abstracts; community resources; interpreting data, charts, tables, timetables, etc.	45,00	45,68	8,64	0,68	59,43	36,93	0,57	2,95	90,68	9,32	96,36	3,52
5	Study skills: Organisation of material for projects, note-taking and reading for different purposes, understanding assignment requirements	38,64	45,08	15,91	0,38	78,03	20,45	0,00	1,52	83,71	16,29	98,48	1,52
6	Learning to learn: Awareness of task demands, flexibility, self-knowledge of learning preferences, awareness of learning process, self-evaluation	42,05	47,27	10,45	0,23	80,45	19,09	0,00	0,45	89,32	10,68	99,55	0,45
7	Planning skills: Ability to design a plan of strategies for meeting learning needs, ability to carry out a plan systematically and sequentially	38,64	50,00	10,80	0,57	71,02	27,84	0,00	1,14	88,64	11,36	98,86	1,14
8	Problem development skills: Ability to formulate questions that are answerable through various research activities (projects, library, readings)	37,50	44,32	16,48	1,70	62,50	35,80	1,14	0,57	81,82	18,18	98,30	1,70
9	Analytical skills: Ability to select and use most effective means of acquiring information, ability to analyse and organise information, ability to select most relevant and reliable information sources	40,15	46,21	13,64	0,00	71,59	27,65	0,00	0,76	86,36	13,64	99,24	0,76
10	Communication skills: Ability to write reports, essays, instructions, discourse, display data, etc.	35,23	44,32	20,45	0,00	71,02	27,27	1,14	0,57	79,55	20,45	98,30	1,70
11	Evaluation skills: Ability to collect evidence of accomplishments and have it evaluated, ability to accept constructive feedback from others	40,34	46,59	12,50	0,57	75,57	21,59	0,00	2,84	86,93	13,07	97,16	2,84
12	Completion skills: Ability to identify problem areas, ability to revise work, commitment to completing units and program	31,82	53,41	14,02	0,76	75,00	23,86	0,00	1,14	85,23	14,77	98,86	1,14
	Total Percentage of SDL	39,47	47,03	12,97	0,53	70,97	27,02	0,31	1,69	86,51	13,49	97,99	2,00

The self-evaluation data of the EPP students' SDL skills disclose that their skills are excellent (thirty nine percent) and good (forty seven percent). When the levels of excellent and good are categorized as high, then the students SDL skills are presumed to be high (eighty six percent). Thirteen percent students believe that they have adequate SDL skills and that of less than one percent suppose they have poor SDL skills. Of the adequate and poor grade, when combined and classified as low, about fourteen percent students see their SDL skills as low. In general, according to self-evaluation of the EPP students, their SDL skills are high and they acknowledge that SDL skills are far-reaching

Discussion

Promoting students' English pronunciation is instrumental in English Phonetics and Phonology class. This viewpoint is induced by the fundamentals in Indonesia Qualifications

Framework (IQF/KKNI) level six that it is imperative for graduate degree to be equipped with the ability to place the concepts and theories of a study field into practice (Kemristekdikti, 2015). This authorizes the researcher to set the concepts and theories of phonetics and phonology as procedural knowledge enabling students to make use of them to promote their English pronunciation. Therefore, EPP is supposed to facilitate students to cultivate their English pronunciation competence.

It is on this basis, the scaffolding assignments are devised and developed. With the construction of seven parts of CLO, name, ILO/sub-CLO, directions, schedule, subject matters, and tasks, students are provided with the information on the expected competences, keywords of the subject matters, timeline, and tasks to scaffold the competences. Thus, they are well informed about what to achieve and how to get there through self exploration of the references and sources as well as self self practices of the pertinent procedural knowledge as guided by the tasks. The tasks in the scaffolded assignments are produced by decomposing exhaustive subject matters into smaller achievable parts as asserted by Skene & Fedko (2014).

The PBL with scaffolding assignments is exploited through the preparation of the assignments and PBL scenario (Pre-Implementation Stage), the application of the scenario (Implementation Stage), and the evaluation of the project development and qualification (Post-Implementation). In the implementation, the PBL commences with the project launching (Orientation Phase), knowledge building through the assignment completion process and project development (Cultivation Phase), project scrutiny by virtue of self and peer assessment (Construction-Reflection Phase), and project display (Presentation Phase). These confirm the fundamental stages and phases of PBL execution (Larmer, J., Mergendoller, J., & Boss, S.,2015).

Being the integral part of the PBL, the scaffolding assignments are believed (eighty nine point five percent) to be valuable in enhancing the students' English pronunciation. The assignments allow the students to manage and direct their own learning and to solve the https://ukrainefriends.org/donate/?utm_source=Blockthrough&utm_medium=Blockthrough&utm_campaign=Blockthrough&utm_id=Blockthrough&utm_term=Blockthrough&utm_content=Blockthroughpronunciation-associated problems (Wood et al., 1976). The scaffolding is proven to be supportive and conducive for an effective learning process (Tedick & Lyster, 2019) and when infused in PBL, they enable lecturer to play the role of facilitator (Boss & Larmer, 2018). This is empirically in line with the finding that the scaffolding assignments are regarded as constructive. This study of PBL as an effectual instructional intervention correspond to the investigation from 1998 to 2017 analysing 12,585 students from 189 schools in nine countries which indicate that PBL has a medium to large positive effect on students' academic achievement (Chen & Yang, 2019).

The enhancement of EPP students' English pronunciation might be numerically imperceptible, from seventy three to seventy eight of the highest grade a hundred. However, this is understandable due to the aspects of prosodic features like stress and intonation and of connected speech such as catenation and assimilation in English pronunciation that are contributory to this achievement. These aspects of English pronunciation are typically arduous to be proficient—it requires frequent exercises (Silva & Da Silva Guerra, 2020) and relatively lengthy exposure to native spoken English interaction. Moreover, native-like English pronunciation in the world of global or international Englishes is no longer the ultimate goal of leaning pronunciation, but it is the intelligible one (Gilakjani, 2016, 2017).

PBL with scaffolding assignments allow the EPP students to be autonomous in learning as previously claimed (Guo,et.al., 2020). They conducively make students complete the tasks via the

related knowledge exploration and pronunciation trainings and thus, it supports the culture of self-taught or autodidacticism through SDL skills development. When the students are designated to record their English pronunciation in the beginning and at the end of the course and to delve into pronunciation-pertinent information in between, they are situated to recognize the pronunciation features, to exhibit their pronunciation performance before learning, and to dig and search the relevant knowledge to train and progress their pronunciation. They are prepared to independently identify their pronunciation weaknesses and seek the solutions to cope with them as the process offered in improving pronunciation using neural networks (Santhoshi, 2021).

It is in this context of working out to recognize the problems and search for the solutions that PBL and SDL become part and parcel. This study facilitate the room for SDL skills promotion confirming the link between SDL and PBL (Stewart, 2007). The findings affirming that the students' stance of 'invaluable' towards the importance of SDL skills (ninety two percent) and that their SDL skills self-assessment of 'high' confirm this link. In the part of digital and information literacy of SDL skills, students believe that they are required to have not only instrumental digital literacy (ninety five percent), but also the mental digital literacy (ninety six percent) and this is consistent with instrumental, mental and sociocultural domensions of digital literacy (Nanni, 2020) and (Hafner et.al., 2015). Other ten parts of SDL skills as shown by the students attitudes and skills in table 5, unveil the students awareness of of becoming self-directed learners with the characteristics of setting clear learning goals for themselves, shaping their learning process in line with goals and plans, monitoring their own learning process, evaluating the outcomes of their own learning, autonomous, having self-motivation, open to learning, curious, willing to learn, valuing learning, having self-control, and taking initiative to learn (Knowles, 1975; Jennett, 1992; Brockett and Hiemstra, 1991). We believe that our method of infusing scaffolded assigments in project-based learning of English pronunciation could probably be usefully employed in the enhancement of language competence and Self-Directed Learning skills.

Conclusion

This paper has given an account of the utilization of project-based learning conciliated with scaffolding assignment. The evidence from this study points towards the idea that the scaffolding assignment-incorporated PBL effectually promotes the academic achievement of English pronunciation and the add-on skills of Self-Directed Learning. The value of our work lies in the thorough coverage of the phonetics & phonology-based English pronunciation in the assignments, the scaffolding consequence of the assignments to conciliate the PBL execution, and the conducive influence of the scaffolding assignment-conciliated PBL upon the students' English pronunciation and SDL skills.

The findings might not be transferable to the teaching and learning process under disadvantaged circumstances. The students with limited access to information and communication technologies and inadequate mental and instrumental digital literacy would probably find this method challenging. Lack of exposure to independent learning and teacher-dependence are unsupportive to the exploitation of this learning.

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