

Multiple Assessment Strategies and Rubrics for the 4Cs of 21st Century Skills

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Abstract

Project-based learning (PBL) is an active learner-centered pedagogy that focuses on collaborating with classmates through deep discussions to create a solution or solve a problem on a real-world issue. PBL is an effective and enjoyable way to develop deeper learner competencies that are required for 21st century success in college, career, and civic life (Buck Institute for Education [BIE], n.d.). PBL is especially fitting for English as foreign language (EFL) classrooms because it provides the learner with a clear and meaningful exchange of communication through the combined skills of listening, speaking, reading, and writing. At the same time, PBL promotes the development for the 4Cs of 21st century skill competencies- critical thinking, creativity, communication, and collaboration. This article is divided into two parts. First, the literature review will look at the background and research on PBL and 21st century skills which leads to the research question of students' perception on PBL and its effectiveness in enhancing students' understanding of the importance of the 4 Cs of 21st century skills in language learning in English classes at a Japanese university. The second part will connect these findings to address the need for alternative ways to assess PBL and propose multiple assessment strategies and rubrics based on the 4Cs of 21st century skills. By customizing Greenstein's (2012) rubrics to fit EFL needs, these new alternative assessments can help teachers to easily implement PBL and the 21st century skills, as they are both an imperative part of the English language awareness process.

Keywords: project-based learning, 21st Century Skills, assessments

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Introduction

Project-based learning (PBL) pedagogy is gaining more recognition in Japanese universities, however, many classes are still taught in a traditional teacher-centered style which limits verbal exchange among students and the teacher. In English language programs, group work and pair work activities are highly favored, however PBL has not yet planted its roots into English language programs at most Japanese universities. One reason lies on the assumptions around the difficulties in assessing individual students' learning. English language assessments have generally focused on native-English speaker attainment looking at grammatical accuracy or native speaker norms by separating each of the four language skills: reading, writing, speaking, and listening. However, the world is changing as English as a lingua franca (ELF) is used among non-native speakers. In accordance, this research takes place at a Japanese university that approaches the study of English by Japanese students with a focus on what Canagarajah (2006) states as the developing of new norms as they use English for lingua franca communication rather than English as a homogeneous language characterized by a uniform norm or grammatical system (p.231-232). Under the literature review, the research finds positive implications for implementing PBL into an EFL class because of its focus on proficiency in terms of performance and pragmatics, rather than, linguistic competence, grammatical accuracy, and memorized information. PBL especially develops certain 21st century skills, known as the 4Cs: critical thinking, creativity, communication, and collaboration as necessary tools that lead to successful and competent students and employees.

Literature Review

Project-based learning (PBL) has been introduced into many classrooms across disciplines for its support of 21st century learning skills also known as success skills essential for college and career readiness. Partnership for 21st Century Skills (n.d.) is a coalition of top businesses and education policy makers and they developed the multi-dimensional Framework for 21st Century Learning to help students visualize that learning does not take place only by studying core subjects. There are four main components of the 21st century skills are: core subjects; learning and innovation skills; information, media and technology skills such as ICT literacy; and life and career skills (Partnership for 21st Century Skills, n.d). Learning and innovation skills are those possessed by students who are prepared for the 21st century and include the 4Cs: Critical thinking and problem solving, Creativity and innovation, Communication, and Collaboration.

PBL is an effective method for building these 4Cs through engaging students with meaningful real-life challenges and creative problem-solving tasks. However, due to the two-fold rise in PBL users especially in the United States, it also means that many teachers are not adhering to the original principles that differentiates a PBL from regular projects. In response, Larmer (2015) revised the previous PBL model by launching a three-part comprehensive *Gold Standard PBL* in early 2015. First, PBL must focus on the students' learning goals of key knowledge, understanding and 21st century skills. Second, the PBL must have the essential product design elements: 1) a driving questions or challenging problem; 2) sustained inquiry; 3) authenticity; 4) student voice and choice; 5) reflection; 6) critique and revision; 7) public product.

Third, the *Gold Standard PBL* provides guidelines for teachers to adhere to when doing the PBL.

Bender reviews primary research findings on the positive research-based outcomes of PBL and its increased engagement with the learning content. In one meta-analysis research by Gijbels and his team, findings showed that “students may improve as much as 30 percent in their understanding of concepts as a result for project-based learning (2012, p.34)”. PBL also helps students to become critical thinkers through well-thought out decisions, and reasoned judgement because PBL provides students with authentic, to-date material through on-line research by scanning, evaluating, and synthesizing the information to make a further discovery in the thought processes. Many researchers have also linked evidence of motivation through PBL and students have demonstrated improved attitudes toward learning. Students exhibit more engagement, are more self-reliant, and have better attendance than in more traditional settings (Walker and Leary, 2009) and “enhanced retention of information because students are processing information in a distinctly different manner than is typically involved in rote learning (Bender, 2012, p.34)”.

In terms of the importance of collaboration, according to Vygotsky (1978), the Zone of Proximal Development is the area of developmental processes that function only when a child is interacting with the people in his environment and in cooperation with his or her peers (p.90) and reflects closely to the reasons behind the needs to collaborate in order to learn and grow from their peers. There are many positive implications for implementing PBL, it may be best summarized by Bender (2012) who states that the use of modern technology tools are also changing the very fabric of schooling by reformulating the teaching/learning process in a fundamental way and students are no longer passive consumers of knowledge, but students are now producers of knowledge (p.37) and it is the 21st century skills and PBL that leads students to “build their own thinking toolkit- the tools that helps students to become confident, productive thinkers and project doers (Kraus and Boss, 2013, p.43)”.

Part I: Research

Purpose of the study

The purpose of this study was to find out student perceptions of 21st century skills as an important part of PBL. If the findings showed a strong correlation of the two, then further studies would continue in creating EFL criterion that can be used to assess 21st century skills in PBL through rubrics adapted from Greenstein (2012).

- i. To find out the students’ perception of project-based learning and its effectiveness in enhancing students’ understanding of the importance of the 4 Cs of 21st century skills in language learning.
- ii. To develop new criterion for EFL rubrics on the 4Cs of 21st century skills and competencies as a formative assessment

The Subjects

The first part of the research goal was carried out to 59 participants at a Japanese university. The students ranges from 19-20 years old, and are beginner level students.

The English program at the university is based on an English as a lingua franca curriculum which places the goal on successful communication through use of strategies rather than grammatical accuracy and native-like pronunciation.

Procedure

The class used a PBL methodology to approach the topics of three chapters of an EFL textbook. Each chapter had a key topic which became the underlying subject of the driving question of the PBL. Each chapter followed the essential product design elements and followed the same procedure. First, sustained inquiry, the students read materials in the course textbook for schematic reading and critical understanding of the subject and vocabulary. Second, authenticity was reinforced by introducing photos, news clips, documentaries, interviews, speeches, and other internet sites that invited discussion on the subject. Whenever possible, other authentic sources are introduced to support linkage of the subject matter to an issue that is closer to home including local, regional, or national situations in order to provide more relevance and increased interest. Students were divided into groups of six students or less.

The students worked on the driving question giving them ample voice and choice to navigate the direction of the project. Throughout the process, each student automatically used the 4Cs because the collaboration was the key component to increase critical thinking through deep discussions and communication. This in turn led to the creation of their creative product or creative problem solving steps. Students were given support by the instructor through formative assessments through checklists, reflection journals, interviews and teacher scaffolding. Next, the students entered the critique and revision process where the students needed to synthesize their ideas to complete the final design of their product and final presentation. The final presentation of their product or solution was presented by their team. At the end of the three projects, the survey was given to each student to see if their 4Cs of 21st century skills had improved through the PBL and if it was important to their English learning.

Research Instrument

A survey of seven questions focused on the 21st century skills and was administered to the participants at the end of the semester. The survey used a 5-point Likert scale measurement for each item: (1) Strongly Disagree; (2) Disagree; (3) Neither Disagree nor Agree; (4) Agree; (5) Strongly Agree.

The survey questions

1. I learned the importance of collaboration with peers on projects and I think this is helpful for me to learn English.
2. I learned to critically think about a problem in comparison to before this class.
3. I gained creative thinking skills through the projects.
4. I learned presentation structure and communicating through group presentations.
5. I learned to study independently/autonomy.
6. I think PBL is helpful for me to learn English.
7. I think PBL motivated me to learn English.

Results and Data Analysis

From this research, the analysis yielded statically strong findings (Table 1) in questions on each of the 4Cs. The first question on the importance of collaboration, yielded 67% strongly agreed and 27% agreed with 0% neither, disagreed, or strongly disagreed. The second question asked if students' critical thinking improved since prior to starting the PBLs yielded that 59% strongly agreed and 30% agreed. Although, explicit teaching of critical thinking was not taught in the classroom, the methodology of the PBL gave the students the life-time skills of discussing, interpreting, evaluating and synthesizing various viewpoints as a form of reasoning. The third question, 55% of the respondents strongly agreed and 41% agreed in gaining creative thinking through the project as the PBL gave complete control to the students to be creative and innovative. The respondents for increased communication through group presentation showed the strongest approval with 75% strongly agreed and 22% agreed as the collaborative nature of the presentation was a motivating factor.

Table 1: Responses to student's perception on PBL and 4Cs

Questions n=59	Strongly Disagree (%)	Disagree (%)	Neither (%)	Agree (%)	Strongly Agree (%)	Median
1. I learned the importance of <u>collaboration</u> with peer on projects and I think this is helpful for me to learn English.	0	0	5.1	27.1	67.8	4.63
2. I learned to <u>critically think</u> about a problem in comparison to before this class.	0	0	10.2	30.5	59.3	4.49
3. I gained <u>creative thinking</u> skills through the projects	0	0	2.8	41.6	55.6	4.53
4. I learned presentation structure and <u>communicating</u> through group presentations	0	0	1.7	22.4	75.9	4.74
5. I learned to study independently/ <u>Autonomy</u>	0	0	8.3	47.2	44.5	4.36
6. I think PBL is helpful for me to <u>learn</u> English	0	0	0	33.3	66.7	4.67
7. I think PBL <u>motivated</u> me to learn English.	0	0	13.6	18.6	67.8	4.54

PBL helped students to be independent but students responses were slightly low as 44% strongly agreed, 47% agreed, and 8% said neither disagree or agree. This is possibly because the group aspect of the project did not give the students a feeling of independence, yet, it was not teacher-centered therefore, the learner-centered area is a

form of autonomous learning. As predicted, over 65% strongly agreed and responded that PBL is helpful for them to learn English. PBL motivated them to learn English also showed strong approval at 67% strongly agree and 18% agreed. However, 13% responded neither calling for the motivation factor as not as high as the 4Cs.

Part II. Future assessment directions

From the above survey results, a strong correlation between PBL for language learners and the development of the 4Cs of 21st Century Skills can be concluded. As the next step, focus on the development of criterion for multiple assessments and rubrics need to be developed in order to better gauge the learning of the PBL through the 21st century skills.

There are a variety of assessment methods to carryout formative assessments. For example, use self-reflection sheets, peer/group reflection, collaborative assessments (Teacher-student), open-ended and closed surveys, checklists and journals. PBL can be a difficult experience for new teachers and many use a formative assessment placing a large weight of the grade on the final presentation. But a study by Van den Bergh et al. (2006) found that many of their instructors were using different ways to assess a PBL program and differed greatly from one teacher to the other causing a discomfort in reliability. Students disliked that in some groups all students were given the same grade while in other groups grades differed and were individualized. PBL have been evaluated by a wide range of assessment methods that are in line with the educational goals, and instructional principles of new learner environment and toward relevant and authentic measures of learning (Greenstein, 2012, p.16). This is further supported with Mergendoller who stated “there is one more element, however, that needs to be added to this mix – formative assessment and feedback (Partnership for 21st Century Skills, n.d., p.1)”.

The holistic rubrics (Table 2) are one type of formative assessments. Greenstein outlines the criterion for rubrics based on the 21st Century Skills and the sub-skills that can be used for PBL. The rubrics can be broken down into a scale of four levels of proficiency from (1) novice; (2)basic; (3) proficient; (4) advanced level of attainment. They are aligned with outcomes and explicit indicators of achievement at multiple levels based on each of the 4Cs (2012, p. 176-200).

Table 2: Holistic Rubric sample for the 4Cs (adapted from Greenstein, 2012)

	4 Advanced	3 Proficient	2 Basic	1 Novice
Critical Thinking (p.200)	Purposefully seeks and uses information and data from multiple sources and prior experience in relation to real-world situations	Finds and uses a few selected facts, sources, and evidence to understand and make a plan	Uses selected data and pieces of information that are provided in relation to learning	Misunderstands facts, data, and principles and needs help to meaningfully utilize them
Creativity (p.176)	Consistently shows flexibility and originality multiple ideas	Generally able to demonstrate and apply components of creativity in the course of the work	Tries to think creatively but sometimes needs help coming up with new ideas	With support, can generate some creative ideas
Collaboration (p.176)	Worked well with others; efficient use of time and equality of participation	Generally stayed on task and participated; used time well	Tried to work with others but did not consistently do their part	Had difficulty working with others respectfully
Communication (p.204)	Clarity, pace, volume, and articulation are all strong and enhance communication	Clarity, pace, volume, and articulation are acceptable for the purpose of the communication	One significant part of oral communication may be compromised	Difficult to hear and follow the communication

Greenstein (2012) further states that “each of the 4Cs can be broken down for more specific and detailed assessment known as *analytic rubrics* (Table 3,4,5,6) which define levels of performance for each criterion as opposed to *holistic rubrics* (as in Table 2) which describe broader levels of performance (p.53)”.

Analytic rubric sample for the 4Cs

Tables 3 through 6 are samples of analytic rubric samples with further breakdown of each 4C called sub-skills. For example, the sub-skills for critical thinking (Table 3) are: evaluate, analyze, and synthesis of multiple views (p.68 & p.200). All of these rubrics have been adapted and customized to the needs of the EFL students on their PBL projects. They have also been adapted and simplified for assessing EFL students in PBL projects and customized in accordance to the class proficiency level and program goals. These rubrics are easy to use as a formative assessment throughout

any point in the PBL process. First, the student could do a self-assessment of their current level and notice the starting level. Throughout several class periods, the student will be motivated in increasing their proficiency level and try to move up in that area. Again, the teacher can also work with the student and evaluate the current square in the rubric and encourage them to move up in the rubric. This self-awareness reflection is important for language learners because they can acknowledge the necessity of the 4Cs and recognize it as separate from linguistic skills of listening, writing, speaking, and listening. They will become aware of the importance of the 4Cs in every step of language study.

Table 3: Analytic rubric for critical thinking adapted for EFL learners

		4 Advanced	3 Proficient	2 Basic	1 Novice
	Critical Thinking	Throughout the PBL, student consistently demonstrates multiple skills in evaluation, analysis and synthesis	Throughout the PBL, student routinely applies two components of critical thinking	Throughout the PBL, student is developing multiple types of CT skills	Throughout the PBL, student is able to understand basic content but struggles to evaluate and analyze
S U B - S K I L L	Evaluate	Student was able to make a reasoned judgement by evaluating all choices before selecting one idea	Student was able to make some reasoned judgement to evaluate and pick one idea	Student was able to compare more than one option and pick one idea	Student was able to pick one idea but was not confident in it
	Analyze	Student identified main issues, and can explain or share each multiple view with reasoned judgement	Student understood main issue and made some conclusions	Student was able to grasp issue and draw simple conclusions	Student was not able to grasp issue and needed help to find and draw conclusions
	Synthesis of Multiple Views	Student identified and compared more than three different views and can make a reasoned explanation on their changed view	Student was able to grasp the main issue and make some reasoned judgement	Student was able to identify more than one view but could not summarize or explain them.	Student was not able to identify more than one view.

The analytic rubric for creativity (p.201) have been adapted for EFL learners. These sub-skills look at the quality of creativity in terms of curiosity, flexibility, and originality of the product development or solution in the PBL. Creativity is sometimes not a required assessment point in English classes. Every project does not need to be assessed on creativity, but if several projects within a semester or school year are assigned, then, it would be beneficial for at least two of the projects to assess certain areas of creativity.

Table 4: Analytic rubric for creativity adapted for EFL learners

		4 Advanced	3 Proficient	2 Basic	1 Novice
	Creativity (self-reflection)	I show flexibility and originality in developing many new ideas	I can create new things if I have some help or suggestions by my EFL teammates	I like be creative but sometimes I need help from others	I cannot come up with creative ideas by myself and need help
S U B - S K I L L	Curiosity	I am curious about creating new ideas and seek them out	I am curious about some things and usually will try to explore	I sometimes am curious about new ways of thinking and doing	I try to avoid new ideas and things because I am not comfortable
	Flexibility	I adopted new ideas and replace old ones to better the outcome	I adopted many new ideas and listened to feedback	I was willing to change direction by listening to feedback	I was unable to listen and respond to feedback effectively
	Originality	I can come up with original ideas	I can come up with some new ideas	I can come up with new ideas with some guidelines or help	I need help thinking of new things

The analytic rubric for collaboration (p.110) include the sub-skills: shared responsibility, productivity, and teamwork. The PBL is a collaborative experience throughout each process. This rubric looks at different areas of collaboration and gives the students several criterion related to collaboration so they can work together toward their final product with equal contribution and shared responsibility. This is a rubric that can be given as a self-evaluation or as a peer-evaluation on their own group. This type of evaluation is helpful especially at several points of the project in order for the student to repair any problems of productivity by slacking students. It also gives each student an awareness that they will be assessed by their peers so it is a motivating way to keep the students on track.

Table 5: Analytic Rubric for collaboration adapted for EFL learners

		4 Advanced	3 Proficient	2 Basic	1 Novice
Collaboration (Self-Reflection, Peer-Evaluation)		We used all our time efficiently to stay focused on the task and contributed equally	We worked well and for the most part stayed on task and contributed equally	We worked well together but everyone did not equally contribute	We didn't work well together and did not contribute enough
S U B - S K I L L	Shared responsibility	Everyone did their best work and followed through on task	Most people followed through on their parts	Some people did not follow through on their part.	Most people did not follow through on their part and could not be depended on
	Productivity	I/ We used high quality time management	I/ We appropriately used resources	I/ We had some problems with pacing	I/ We needed support to stay on task
	Teamwork	I/ We contributed to all group discussion and task through valuable input	I /We contributed to group discussion and tasks	I /We contributed some knowledge and information to the group	I /We needed support from teacher to discuss information

Finally, the analytic rubric for communication (p.204-205) includes the sub-skills of receptive communication, informal and formal written communication and the skills associated with giving presentations. Non-verbal communication is also a criterion for communication because receptive communication is equally important in the PBL which requires extensive listening skills in order to think critically and synthesize several students' ideas. Written communication can be in form of individual writing, group writing, or journals and blogs to record their reflections. The presentation is the final part of the PBL. It is a large part in that all of their work leads up to this final presentation. However, the assessment should only be a portion of the overall grade and assesses presentation skills, preparation, and stage presence rather than accuracy, memory, or pronunciation.

Table 6: Analytic rubric for communication adapted for EFL learners

		4 Advanced	3 Proficient	2 Basic	1 Novice
Communication		Student produces communication using EFL or ELF strategies for understanding	Student produces communication that is comprehensible and uses some EFL or ELF strategies	Student is able to use one EFL or ELF strategy to produce basic communication	Student is unable to produce basic communication or use any of the EFL or ELF strategies
S U B - S K I L	Receptive Communication	Student listened to other student's viewpoints and responded respectively	Student usually listened to other students' viewpoints with respect	Student sometimes listened to other viewpoints but with only a little respect	Student did not listen to other viewpoints
	Written Communication	Student wrote logically with clear and logical process using descriptive details	Student wrote logically with topic and complete details	Student wrote somewhat logically with topic and some details.	Student wrote without complete sentences or details
	Presentation	Student was well prepared and displayed good stage presence to attract the audience	Student was somewhat prepared and displayed good stage presence	Student was somewhat prepared and sometimes relied on notes, support, and at times uncomfortable	Student was not comfortable and was not prepared. Needed extensive notes and support

Conclusion

In conclusion, fifteen years into the 21st century, assessing these success skills and competencies are no longer a dilemma. From the teacher's perspective, the rubrics help them to easily identify and assess individual efforts and abilities. Also, they can now assess critical thinking skills and creativity that were once labeled as hard to do. Also, from the student's perspective, rubrics are helpful for them to notice and become aware of their language learning process. Language learning is not just about the grammar and the vocabulary, but it is the way language is used in communicating the needs and ideas of one person to another. This research continues to test more university English classes with hopes that teachers will shift to multiple assessment strategies and rubrics based on the 4Cs to produce globally competent 21st century skill users through PBL projects.

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