# Searching for an assessment method for the 21st century. Student board game design and rubrics

# En búsqueda de un método de evaluación para el siglo XXI. Diseño de juegos de mesa por estudiantes y rúbricas

*Rosa Natalia Moncada Morales [a], Maria del Carmen Serratos Vázquez [b]*

**Abstract:**

Within the booming context of teaching learners the so-called 21st-century skills, tutoring teachers in novel teaching methods, approaches, and evaluation strategies, coupled with the massive trending use of games and gamification tactics, merge a necessity for teachers to be able to join together a series of requirements if they want to keep up-to-date as a part of the 21st century educational curriculum.

In the quest to find activities that motivate English language students at the Language Center in the Autonomous Metropolitan University at Iztapalapa and Azcapotzalco campuses, it was decided to use a game-oriented activity. In many cases, a game-based approach has been used as a pedagogical activity that transmits knowledge; however, the possibility to create knowledge and to use games as evaluation tools has been set aside. Having analyzed learners' perspective on the overall activity, it was decided that the assessment strategy needed deeper examination so that an implementation model could be proposed. It was considered that the rubrics used had the opportunity to be enriched. Thus, the types of rubrics and their characteristics were further investigated so that the rubrics initially used could be re-elaborated and improved. After the theoretical research, it was concluded that even though rubrics pose a positive assessment tool, they do need thorough planning and evaluation.

*Keywords:*
*assessment, game-based learning, motivation, rubrics*

**Resumen:**

Dentro del creciente contexto de la enseñanza de las llamadas habilidades del siglo XXI, el enseñar a maestros sobre métodos de enseñanza y estrategias de evaluación, aunado a la masiva popularidad del uso de juegos y estrategias de gamificación, surge la necesidad para los profesores del ser capaces de reunir una serie de requerimientos si quieren mantenerse actualizados como parte del currículo educativo del siglo XXI.

En la búsqueda por encontrar actividades que motiven a los estudiantes de inglés en el Centro de Lenguas de la Universidad Autónoma Metropolitana en los campus de Iztapalapa y Azcapotzalco, se decidió utilizar una actividad de juego. En muchos casos, un acercamiento de juego se ha utilizado como actividad pedagógica para transmitir conocimiento. Sin embargo, la posibilidad de crear conocimiento y de utilizar los juegos como recurso de evaluación, se ha dejado de lado comúnmente. Habiendo analizado la perspectiva de los alumnos sobre toda la actividad, se decidió que la estrategia de evaluación necesitaba un análisis más profundo para que se pudiera proponer un modelo de implementación. Se consideró además que las rúbricas utilizadas tenían oportunidad de ser enriquecidas. Por lo tanto, los tipos de rúbricas y sus características se investigaron más a fondo para que las primeras rúbricas utilizadas pudieran mejorarse y reelaborarse. Después de la investigación teórica, se concluyó que aunque las rúbricas son una herramienta positiva para evaluar, requieren de cuidadosa planeación y evaluación.

*Palabras Clave: aprendizaje basado en juegos, evaluación, motivación, rúbricas*

a Rosa Natalia Moncada Morales, Universidad Autónoma Metropolitana Iztapalapa, https://orcid.org/0000-0003-3388-9769, Email: rmoncada@izt.uam.mx

b María del Carmen Serratos Vázquez, Universidad Autónoma Metropolitana Azcapotzalco, https://orcid.org/0000-0001-5778-4203 Email: mcsv@azc.uam.mx
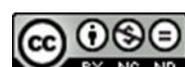
## Introduction

This paper builds on a language learning research project that started in the last trimester in 2019 at the Universidad Autónoma Metropolitana, Azcapotzalco and Iztapalapa campuses. The aim of the inquiry was to reverse to some extent the typical teacher-student roles when it comes to board game design and usage to boost learner motivation and meaningful learning, and to introduce novel assessment strategies at the same time. Furthermore, it was considered that both strategies would increase student motivation in the language classroom. That is why, students were commissioned to design board games that integrated topics reviewed in class, and that complied with game design recommendations.

For that 2019 original project, game design was discussed in a nutshell with students so that they themselves were the ones taking the lead in the design of their own games, not only because it is motivating for them, but also because it is a cognitive workout that tackles 21st century skills (ASIS&T, 2014) such as learning how to think by finding evidence, consulting goals, analyzing them, and making decisions. 21st century skills are also divided into learning, literacy, and life skills; all thought of as being essential for nowadays students, who need to keep up-to-date with current market needs (Stauffer, 2020).

Contrary to where the individual is the player, game design places the individual in the role of the producer, and for this project, collaboration, communication, creativity, and critical thinking skills were put to the test. More specifically, learning by game design refers to the process of learning content during a design task that promotes greater engagement with content. What is more, if "games can lead to changes in attitudes, behavior, and skills" (Ifenthaler, et al., 2012, p. 4), then it can be assumed that not only playing, but also going further and designing a game must represent greater changes in the learners' learning process. Board games were chosen because it was considered that they were manageable enough for students, given that in our classrooms most of them lacked basic technology literacy skills. Notwithstanding this, it was believed that this task would help them "think *for themselves*, instead of persistently (...) searching for answers by means of Google search" (Chee 2016, p.13) When 21st century skills are added to the curriculum and become an integral part of the learning goals explicitly established, then the person as a whole will be truly taken into account (Piirto, 2011), but beyond that, individual strengths and interests will be promoted and exploited from an intrinsic viewpoint, i.e., because the person is motivated from within. This does not mean that extrinsic motivational factors are necessarily negative, but it may seem that a prerequisite of creativity, which in turn leads to innovation, is possessing the inner drive to want to be creative (Piirto, 2011).

More and more often, the technological developments of the computer have ensured that there are numerous opportunities to offer the curriculum in an authentic, complex, and meaningful context. It can be stated that technology use is now deeply linked to generations Z and Alpha, since we are currently teaching such generations one of the opportunities to enhance the curriculum is gameplay. When playing games, learners are merged in personal learning experiences, which are less accessible in regular educational settings. During gameplay, learners can reflect on their actions and they can draw conclusions, adjust their hypotheses, and test them again, if needed (Gee, 2003). Games facilitate a so-called 'trial-and-error' approach that has been considered supportive of the development of logical thinking and problem-solving skills. Games can provide experiences across various situated contexts that enable learners to understand complex situations (Shaffer et al., 2004). These above-mentioned characteristics of gameplaying could contribute to knowledge construction (Gee, 2003). Besides that, students are in control of the game (Kirriemuir & McFarlane, 2004), which indicates a certain level of self-regulation. In sum, games very well fit with the social constructivist theory of learning. At this point, a relevant detail must be highlighted. Even though there seems to be a gap between the research of more traditional games, and the one that has been booming for some time now in the field of video games in general, the theoretical foundations run across all games, given that they are all founded on the same core elements. Play represents an alternative way of teaching, and as Shute and Ke (2012) describe, it's part of the "ways that increase student engagement and yield a rich, authentic picture of the learner (s)" (p. 43).

## Literature review

Checklists can be useful assessment tools, however; they do not have the scope that rubrics do, which is to describe desirable qualities as well as common pitfalls in student work. Such descriptions tend to be quite informative for students, thereby helping them think, learn, and produce high-quality work (Andrade, 2005). Rubrics have been widely used to help assess open-ended activities (Vercellotti & McCormick, 2021), i.e., activities that do not have anticipated answers because of their own productive nature such as writing and speaking tasks. A rubric can be distinguished from other similar tools because it must have two parts: "*criteria* that express what to look for in the work and *performance level descriptions* that describe what instantiations of those criteria look like in work at varying quality levels, from low to high" (Brookhart, 2018, p. 1). Rubrics are usually divided into analytic and holistic rubrics. Holistic rubrics offer non-specific information since they consider the criteria altogether and produce one single score. Thus, these do not provide students with pivotal information on the skills in need of improvement. On the other hand, analytic rubrics consider the criteria separately, which requires the instructor to give different scores for each criterion (Brookhart, 2018, Vercellotti & McCormick, 2021). This characteristic makes analytic rubrics the optimal tool to let learners know where they stand and where they need

to head next (Hattie & Temperly, 2007, as cited in Brookhart, 2018). Therefore, rubrics can be seen not only as a grading method, but as a learning one as well, when shared with students (Brookhart, 2018) Additionally, one of the added benefits of utilizing rubrics is the fact that they can help to avoid subjective marking, given that open-ended task assessment tends to be biased in the sense that it is frequently carried out through the rater's own perceptions (Green & Hawkey, 2012, as cited in Vercellotti & McCormick, 2021).

When analytic rubrics are designed and created involving students' suggestions to provide peer assessment, self-assessment, and ultimately teacher marking, they become instructional rubrics because they are used not only to teach, but also to evaluate (Andrade, 2005).

## Rubrics and game-based learning assessment

When a teacher approaches game-based learning, there are several issues they need to deal with: from game design, play, learning, curricular goals, feedback, to assessment. Inevitably, the question as to which evaluation method is the most adequate when play is intended to aid learning, emerges. More particularly for this research project, all the aforementioned points needed to be handled from a language classroom perspective, given that language teaching and learning require their precise considerations, particularly when it comes to assessing production skills and complying with the curriculum of the university.

There are three possible assessment resources within the game-based learning field. The first is game scoring, which takes into account tasks to be completed, obstacles, and targets that need to be achieved or conquered. The second is external assessment, which happens outside the game environment and can range from questions, essays, interviews, to mind maps, and the like. The third is embedded assessment, which takes place during the game and is usually compiled by means of the same game programming (Ifenthaler, 2012).

Since research in game-based learning and assessment has majorly focused on videogames and their particular traits, we encountered one grave issue due to the fact that board games do not require any computer technology to work, and virtually there cannot be any embedded assessment, i.e., internal assessment that is part of the game, but does not intrude in the game (Ifenthaler, 2012); nor does a sort of stealth assessment could be integrated. Furthermore, there are obvious challenges to overcome when assessment after learning is chosen. It was then decided that broader options had to be analyzed and taken into account for this particular project.

Learning autonomy has been presented as an important ability to develop, so self-assessment goes in hand with it. An instructional rubric that helps students reflect on

the quality of their work as well as determine the level they reached in the stated rubric goals or criteria and amend accordingly (Andrade, Du and Mycek, 2010, as cited in Andrade, 2010). When used for assessment purposes, self-assessment promotes students to enhance their own learning because they become their own judges and can clearly realize the areas they need to work on. For self-assessment to be of use, there are certain steps to be followed, such as self-observation, self-judgment, and self-reaction. If taken progressively, these processes will result in students' self-efficacy improved beliefs, this translates on students' perception of improvement of their own abilities to learn (Paris & Paris , 2001 as cited in Kim, 2019).

However, self-assessment should be guided somehow, and feedback can serve the purpose of offering learners a more detailed report of what they need to reflect on. If feedback is considered to have two main functions, which are verification and elaboration (Belland, 2012), i.e., letting students know whether a response was right or wrong and letting students know how to improve performance, then proper feedback can be said to be key in order to help build 21st century learning skills.

Rubrics are assessment tools that offer feedback in a myriad of aspects. They have the capability of evaluating how effective the instruction was, what was learned during gameplay; register the progress of learners; offer learners an insight into their current state, tell them where they should go and what they could improve (Vercelloti and McCormick, 2021). Rubrics can also be adaptable to a variety of assessment forms. These have been administered not only for self-assessment work, but in formative assessment processes as well, among many others. Rubrics are common assessment tools for productive skills. This makes them the ideal assessment tool for a task that involves the use of ludic activities such as board games, due to their inherent unexpected essence. Rubrics can contribute to performing assessment while learning, since these can help provide instant feedback based on an embedded assessment modality (Ifenthaler, 2012) performed by the teacher, as well as offering learners a time to reflect more introspectively on several learning goals and outcomes when using the rubric for peer or self-evaluation.

## Methodology during first stage

### Context

In 2019, prior to the outbreak of Covid 19, five groups at two UAM campuses participated in this project by designing a board game. Students were divided into groups ranging from 3 to 5 participants. The teams were asked to design a board game guided by a rubric that included: the topic, the objectives, the design, the materials, and the main characteristics of their proposal. Students were given one week to think about their game, and three more to build the game. At the end, they brought their games to class to play with them for a while and to play with other teams' games. The aforementioned games brought to class were evaluated

amongst peers and the leading teacher, by means of two different rubrics. The one used by the teacher evaluated the game projects only, whereas the other one was used by the students to perform peer evaluation. This first part of the project took place during one term only due to the ongoing pandemic and has been at a standstill for the same reason. Nonetheless, it is expected to be resumed, conditions permitting. At the end of the course, students were asked to complete a survey, and the results demonstrated a positive attitude towards the whole process that occurred during the term, and that involved students designing their own games, bringing them to class, playing with games made by their classmates, assessing their peers' games, and being assessed in turn by them and the teacher.

### PARTICIPANTS

This study took place at the language centers (CELEX) in UAM Azcapotzalco and UAM Iztapalapa, where it is mandatory for undergraduate students to study three levels of English regardless of their major. Given that the teachers are never able to choose their level of teaching due to institutional reasons, the participants' language proficiency was very varied, ranging from an A1 (CEFR), to B1. Moreover, groups did not only have learners from all majors on offer at each campus, but learner age also turned out to be quite varied, spanning from 18 to 40 years old. For this particular study, language proficiency, age, or field of study, were not considered to hinder or aid the game design process, which was the pivotal point.

### Intruments

Two kinds of instruments were chosen for the first part of the study that took place in 2019: rubrics and a survey.

The survey was built using Google Forms and was administered online. The survey had 20 questions and was divided into 8 sections. Each section aimed at gathering data from the ethnographic information, whether learners were familiarized with board games, the difficulty the activity posed to them, the vicissitudes of teamwork, what they liked or did not enjoy during gameplay, whether they were motivated by the activity, how they would improve the activity, and how useful the exercise was to review and practice what they had learned during the term. A total of 67 students completed the survey.

### Findings

#### A) The rubrics

In regards to the instruments utilized, the first rubric used with students for peer review was based on a holistic rubric model (Figure 1), hence proving to be too general to obtain the most accurate results. Thus, results showed the need to include more specific assessment criteria, and that could not only provide a more trustworthy and fair mark for students, but also pinpoint the target areas of improvement for them in a clear, concise manner. As it will be discussed in the following section, analytic rubrics present a very fruitful tool in this regard.

On the other hand, after a more profound examination of what aspects required more precise assessment so that learners can be successfully guided with this assessment method, it was observed that this rubric mainly focused on aspects of the board game design, and did not offer the opportunity to focus on language learning aspects, particularly in the production skills that were expected to be strengthened. In addition to that, the holistic rubric turned out to be too open for students because they were given the space to express their ideas in the box "Further comments". Even though students were expected to be able to provide deeper insight into what they observed in each criterion during the game, their observations did not add any information to such criterion, and was redundant in the end. The teachers could only speculate that the rubric was not easy to follow for students due to the fact that it did not provide any guidance on what kind of comments were expected.



*FIGURE 1- First peer review rubric used during the first stage of the project*

#### B) The survey

Another instrument was the survey, which generated data on student population, and how acquainted they were with board games in general. Most students reported having previous knowledge of board games, but not having played many. In this survey, 97% of the

students reported that they had the opportunity to study or review language topics while designing their game. Another 49.3% said that working in teams was easy, whereas 6% said it had been extremely complicated. In regards to the division of the workload among group members, 55.2% said it had been quite just, while 6% reported the exact opposite.

Sixty-two out of the sixty-seven students responded to the open-ended question about their opinion. Ten students stated that having the opportunity to design a game had awakened their creativity and that they were able to enjoy their classmates' games as well. Another eight students said that their effort was rewarded and it was great to practice and review topics while working on their design. Some others mentioned that they really liked that the class was dynamic and competitive. Three students said they had enjoyed the human interaction and meeting new people. A couple more said that deciding on the topics to include in their game was certainly testing, but that using the language during the game was stress-free because they were not afraid of making mistakes.

The suggestions on how to improve the activity summarize as follows: a student mentioned that the activity was not useful to practice writing. Other students reported that in some games the rules were unnecessarily confusing, other games were boring and others very long and complicated. Some games were not fun, or did not include topics from the course.

About their self-evaluation, they realized that the game did not come out as they had pictured in their mind. They came to realize that they needed to work on designing better rules and objectives. Some realized it was hard to explain and understand rules, especially in English. They also said it would have been a good idea to practice longer in order to memorize the rules. Many students suggested that the teams should be bigger so that the game was more fun and entertaining. Others stated they wanted the teacher to pay more attention to the language they speak during the game, so that it is always in English and they practice more.

## Second stage

Currently, even with the ongoing academic halt, it was decided to continue this project because it involves a deep analysis of the assessment strategy that was selected for the activity: rubrics. These were chosen because they were considered to be objective, versatile, and adaptable enough to help assess both the implemented project and the students' language acquisition and motivation.

For the purposes of this paper, we took the criteria of the first holistic rubrics as guidelines, and evolved those into analytic rubrics that will not only evaluate the game itself, but also students' performance and language self-assessment during play. It is expected that these new rubrics can be put to use during the course of 2022 when students are allowed in the classrooms again.

## Considerations and following steps

The theoretical project at hand has very specific needs to be met given that there are areas of improvement in order to advance the implementation of student board game design, its results in terms of language learning, and how these can be confidently assessed within a 21st century curriculum.

First and foremost, there is a need to divide the rubrics into two transparent and unmistakable parts: on the one hand, assessment of the game itself as a product of the task assigned (Figure 2). On the other hand, assessment of student performance during the gameplay experience (Figure 3). Both rubrics would have their own specific criteria and performance levels, adapted to the teaching context, learning goals, and task goals. Lastly, we considered a third rubric to be used for the self-assessment process (Figure 4). The rubrics have been improved and will be applied in different moments of the strategy. Having used and experimented with a rubric the first time, it was later regarded that rubrics should always undergo a process of pre and post-review so that flaws are identified and corrected (Vercellotti and McCormick, 2021). In addition to that, the rubrics will be discussed with students in a scaffolded exercise, in which they will elicit information about the aspects that they consider to be important in the latter assessment process.

Student participation in the design of the rubrics is necessary in order to have clearer and more explicit goals of the use of rubrics for both teachers and students (Brookhart, 2018). This may keep the motivational, imagination, and creativity development factors that were found to appeal to students in this activity, according to findings in the survey administered at the end of term. Furthermore, given that learning by means of games seems to aid the learning process because games transport us out of the real world (Huizinga, 1955, as cited in Ifenthaler, 2012), it is apparent that students should be able to continue to benefit from this particularity again since this was reported to be one of the aspects they enjoyed from the task.

## Board Game Rubric

| Criteria | Poor 1 | Needs improvement 2 | Proficient 3 | Outstanding 4 | Points |
|---|---|---|---|---|---|
| Clear rules | Rules were difficult, a lot of time was spent trying to understand the game. | Rules were explained, but it was difficult for some students to understand how to play. | Rules were mostly clear, but there were a few gaps. | Rules were completely clear, everyone understood how to play. | |
| Clear goals | Students did not understand how to win the game or what the goal was. | The main goal of the game was not very clear. It was confusing to know how to win. | Students mostly understood the game's goal but lost focus while playing. | Students understood the objective of the game and what to do in order to win easily. | |
| Course contents (grammar/ vocabulary) | Students included very few or nonlinguistic items from the course into the game. | Students included only a few linguistic items from the course into the game. | Students included many linguistic items from the course into the game. | Students achieved the goal of including a wide variety or linguistic items from the course content into the game. | |
| Degree of challenge | No players made efforts to beat the others, there were many winners. | A few players felt they had to make an effort to beat their rivals. | Most players felt they had to make an effort to beat their rivals. | All players felt they had to make an effort to beat their rivals. | |
| Time spent playing | The game could not be played for some reason or it wasn't possible to finish the game due to time. | The game hardly lasted 10 min or exceeded 35 min. | The game lasted from 10 to 35 min from beginning to end. | The game lasted from 15 to 25 min from beginning to end. | |
| **Mark:** _____ | | | | | |

*FIGURE 2- Board game rubric to be tested*

## Student Performance Rubric

| Criteria | Poor 1 | Needs improvement 2 | Proficient 3 | Outstanding 4 | Points |
|---|---|---|---|---|---|
| Use of game language | The student didn't use any phrases or verbs. | The student used a couple of phrases or verbs commonly used during gameplay. | The student used some phrases or verbs, but they couldn't use others. | The student used all phrases and verbs we learned. | |
| Use of English during the game | The student used only Spanish during gameplay. | The student used mostly Spanish and a little English. | The student used mostly English, but some Spanish. | The student only spoke in English. | |
| Confidence | The student didn't use English confidently and fluently. | The student was able to speak, but their fluency and confidence was not good enough. | The student was fluent and confident, but there is room for improvement. | The student was very fluent and confident while speaking. | |
| Use of grammar and vocabulary from course | The student had a lot of problems using correct structures and didn't know all the necessary words. | The student had some problems using correct structures and didn't remember some words. | The student didn't have many problems structuring ideas and knew most of the necessary words. | The student's structures were very clear and didn't have any problems with words. | |
| Pronunciation | The student has several problems to communicate, speaks slowly and it's difficult to grasp what they say. | The student can say some things clearly, but not all of them. | The student can mostly speak clearly, but they have problems with some words. | The student speaks clearly. There are no problems understanding what they say. | |
| **Mark:** _____ | | | | | |

*FIGURE 3- Student performance rubric to be tested*

## Self-assessment Language Use Rubric

| Criteria | Poor 1 | Needs improvement 2 | Proficient 3 | Outstanding 4 | Points |
|---|---|---|---|---|---|
| Use of game language | I couldn't use any phrases or verbs. | I used a couple of phrases or verbs commonly used during gameplay. | I used some phrases or verbs, but I couldn't use others. | I used all phrases and verbs we learned. | |
| Use of English during the game | I used only Spanish during gameplay. | I used mostly Spanish and a little English. | I used mostly English, but some Spanish. | I only spoke in English. | |
| Confidence | I didn't use English confidently and fluently. | I was able to speak, but my fluency and confidence was not good enough. | I think I was fluent and confident, but I can still improve. | I consider that I was very fluent and confident while speaking. | |
| Use of grammar and vocabulary from course | I had a lot of problems using correct structures and I didn't know all the necessary words. | I had some problems using correct structures and I didn't remember some words. | I didn't have many problems structuring ideas, and I knew most of the necessary words. | My structures were very clear, and I didn't have any problems with words. | |
| Pronunciation | It's really hard for me to speak. I speak slowly. People have problems understanding what I say. | I can say some things clearly, but not all of them. People have some problems when I try to express an idea. | I mostly speak clearly, but I have trouble with some words. People can understand what I say. | I speak quite clearly. People can perfectly understand what I say. | |
| **Mark:** _____ | | | | | |

*FIGURE 4- Self-assessment language use rubric to be tested*

Secondly, after careful observation and time planning, it was decided that it is crucial to present students with a model of a game whose objects and spaces are adaptable and re-usable, but the contents can be adapted in such a way that the game can be played several times during the course. Sevi-Biloon (2017) asserts that this strategy's success is related to its frequency.

The following objective is related to language use during gameplay. Students must be instructed to use the target language at all times while playing the games. Although it is a relaxing and non-stressful situation, students from a previous experience asked for the teacher to encourage the use of the target language during the game session to benefit the most from the practice. To this purpose, some prompts with "helpful language expressions" have to be designed for players to rely on.

Lastly, taking into account repeated comments in the survey, group participants would have to be balanced among the groups, and games have to be pre-evaluated and accepted by the teacher so that they are not extremely easy or, on another extreme, complicated, based on the previous experience.

## Conclusion

Most current models of education are evolving rapidly. This entails a necessity for all parties involved to have the capacity to adapt as quickly as changes in educational settings emerge. This swift development has

been observed from a broad level including curricular adjustments, to much more particular classroom endeavors such as assessment. Out of the wide range of assessment tools, it was observed that gameplay is a viable strategy to provide either a formative or summative assessment activity. In this case, not only gameplay, but game design was regarded as an adequate instrument to help learners to build on some of their 21st century skills, alongside their English language acquisition. However, this activity alone could not demonstrate the learners' abilities per se; thus, requiring a matching assessment method. Well-designed rubrics can be a fair assessment tool for both: games design and language performance. Given that rubrics can be built together with students, many more learning styles, personalities and even teacher's bias can be tackled. They prove to be flexible and adaptable to aid a variety of assessment moments for teachers. This utility of rubrics helps this project to provide a tool to perform teacher, peer, and self-assessment.

Having made a thorough analysis of the activity and use of rubrics, the preliminary rubrics intended to be used have been designed to be tested and discussed with learners in time. When face-to-face activities can be carried out normally at Universidad Autónoma Metropolitana, the second part of this research project will be put to the test.

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