

What Criteria are Important for Evaluating the Quality of English Language Learning Edtech Products? Evidence From Literature

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Abstract: The development and use of educational technology (EdTech) products have increased substantially in the last decade. Among other countries, India has witnessed a surge in the supply of EdTech products at the school education level spanning different disciplines. Primary among them has been English language learning EdTech products. In parallel, there has been an increase in demand for the same from stakeholders in India. However, in absence of a reliable framework to evaluate the quality of the available EdTech products in the education landscape, it has become difficult for the stakeholders to make meaningful choices on which product to use or adopt. In this regard, through a review of the literature, this paper identifies criteria to determine the quality of English language learning EdTech products that intend to benefit English as a Second Language (ESL) or English as a Foreign Language (EFL) learners in schools. The identified criteria can benefit decision makers to evaluate the quality of English language learning EdTech products in countries where English is taught as a second or a foreign language.

Keywords: language learning, educational technology, literature review, criteria, evaluation

1. Introduction

The development and use of educational technology (EdTech) products have risen substantially in the last decade, and more recently, in the Asian countries of India and China (Burns, 2021). The rapid surge of products has given a wide range of products to choose from but, in turn, it has uncovered a challenge. Stakeholders, including parents, teachers, and government officials, are finding it increasingly difficult to choose effective products in absence of a reliable framework that can inform them on how to determine the quality of EdTech products (Patel et al, 2021). Given the rising demand and supply of English EdTech products catering to the school education space, there is a need for a framework that takes into account the unique features of learning English as a second foreign language and is contextualised to enhance the learning of students in India.

Teaching and learning English as a second language in a multilingual classroom context is a complex process. Debates around 'Reading Wars' (Castles et al, 2018) concerning language development have been going on for decades. Standards and guidelines to set the quality of English language teaching and learning in a classroom exist in the ecosystem (Common Core State Standards, 2010; EdReports, 2022) but they are based on developed-country contexts where English is taught as the first language. Hence, they cannot be adopted to evaluate English language learning EdTech products that are designed to benefit English as a Second Language (ESL) or English as a Foreign Language (EFL) learners in school. The criteria highlighted by the Government of India (Department of School Education and Literacy, n.d) to evaluate e-Content fall short of incorporating English language learning specific criteria. This highlights the need to identify and design context-specific criteria to evaluate English language learning EdTech products, catering to ESL or EFL learners.

This paper identifies a set of concrete, reliable, evidence-informed features that can allow stakeholders to evaluate the quality and pedagogical suitability for curricular integration of EFL or ESL EdTech products. We define what these features mean and specify what to look for in EdTech products.

The findings of this paper contribute to the field of learning English using technology in school education.

2. Methodology

Literature review was done to identify the relevant criteria to determine the quality of English language learning EdTech products and the features of implementing them. A keyword search was done for each criterion in content, pedagogy and technology. Google Scholar, Science Direct, and Education Resources Information Center (ERIC) were used as the major source for finding papers. Papers were also selected through snowballing technique from the reference sections of the selected papers. Reviewed journals are at the intersection of three disciplines: Technology (Example, Computers & Education), Language learning (Example, Computer Assisted Language Learning) and Psychology (Example, Journal of Educational Psychology). The inclusion criteria of the review papers were as follows. First, all the studies were published in peer-reviewed journals between 2012-22. Seminal papers with theories related to language learning, and policy reports move beyond this range. Second, only the studies that explicitly focused on aspects of language learning were considered. Third, journal articles were based on empirical research covering students of the school-going age. Studies could be from multi-country contexts but cater to EFL or ESL learners.

3. Important criteria to determine quality: Evidence from the Literature

The section reviews literature and outlines criteria across content quality, pedagogical alignment and technology and design, to evaluate quality of English language learning EdTech products.

3.1 Content Quality

Besides ensuring content accuracy, the product design should also consider the comprehensibility of the content by the intended learners. It depends on the accent, vocabulary, and sentence structure used. Machine voice or foreign-accented voice may add to the cognitive load of the learners (Mayer, 2014). The use of figurative language, such as metaphors and analogies as well as strong conceptual material and large academic vocabulary, make texts difficult to understand (Common Core State Standards, 2010). Next, representation of race, gender and other forms of identity can affect learning positively (Dore, 2022), but there should not be a reinforcement of stereotypes associated with these identities. Texts of adequate complexity (measured by layout, layers of meaning and ideas of the visual text, font size, spacing, and illustration) for particular grades should be included (Common Core State Standards, 2010). For instance, a text with small fonts, dense language, multiple layers of meaning, time shifts, multiple characters, and storylines is typically difficult to follow, especially for students in lower grades. Exposure to multiple forms of content such as digital storytelling (Quah and Ng, 2021), poems, and drama (Zhang et al, 2018) can also improve language skills. Technology-mediated balanced approaches to teaching important components of literacy can improve reading achievement (Lysenko et al, 2014). All essential literacy components, including phonological awareness, decoding, oral language development, vocabulary, comprehension, and writing are covered in it. Products should cater to both lower-order (decoding, sound-symbol code) and higher-order (comprehension, metacognition) skills including guided reading and repeated reading, as well as writing skills. Good products should consider explicit skill instruction and practice to reach all learners (Castles et al, 2018). The criteria and what to look for in products are given in Table 1.

Table 1. *Criteria under Content Quality to check the quality of English EdTech product*

Criterion name and meaning	What to look for in EdTech products
<u>Content Accuracy</u> : Correctness of all forms of content in the product	Presence of proper facts, explanations, spellings, grammatical usage, pronunciation and punctuations
<u>Comprehensibility</u> : The language can be understood by intended learners	The accent, vocabulary is easy to understand by intended learners

<u>Inclusivity</u> : Include representation of the diverse learner groups	Unbiased representation of multiple sections of the society in the content that learners are familiar with
<u>Content complexity</u> : The text is at the level of the child	The layout, layers of meaning and ideas discussed are age appropriate
<u>Types of texts</u> : Texts of diverse nature	Availability of varied texts to engage with
<u>Skill coverage</u> : Covers language-specific skills	Explicit instruction and coverage of English language skills aligned to the national curriculum and policy

3.2 Pedagogical Alignment

The capacity to keep learners engaged with the content is important while evaluating the quality of an EdTech product. Emphasis on a conversational style in first-or-second person rather than a third-person impacts friendliness, retention and cognitive processing (Ginns et al, 2013). Cues should direct learners' attention to the relevant parts of the content or highlight the organisation of the material (Van, 2014). The presence of content in meaningful, coherent, and learner-paced segments rather than continuous units contributes to overall learning (Mayer and Pilegard 2014). Short and engaging content should be placed in a context that is aligned with their lives, needs and interests to have a strong influence on their learning (Zhang et al, 2018). Authentic context, in which language can be used in real life, helps learners master the content (Hwang et al, 2014). Context-aware technologies can also be used (Shadiev et al, 2017). It is important to check if the product helps the learners to construct the meaning of the content rather than merely transmitting information. The presence of guiding questions that help learners make connections, construct and test mental models can turn watching videos into an active learning experience. Appropriate scaffolds can help (Sysoev et al, 2022). Learning objectives and assessment questions should be aligned (Biggs, 1996) and the rigour of questions should meet the level of the learners (Hsu, 2016). Ensuring collaboration with other learners improves language skills and the aspect of anonymity can support a learner towards this (Jiang and Zhang, 2020). There is consensus in the literature that receiving feedback following the completion of a task is an effective technique to enhance learning (Wilson and Czik, 2016). Feedback should be easy for learners to interpret and should state ways in which learners can rectify their errors. However, simply providing feedback is not enough to alter a learner's post-feedback behaviour. Detailed feedback with motivational messages can help (De Sixte et al, 2020). Adult support features, for teachers and parents, to help learners use and effectively integrate the product into learning are essential. The criteria and what to look for in products are represented in Table 2.

Table 2. *Criteria under Pedagogical Alignment to check the quality of English EdTech product*

Criterion name and meaning	What to look for in EdTech products
<u>Constructivism</u> : Allowing construction of meaning of content on their own	Examples, guiding questions to help learners reflect on learning, provision of scaffolds when required
<u>Rigour</u> : Activities, exercises at the level of rigour appropriate for learners	The activities challenge the learners to an appropriate level, without demotivating them
<u>Alignment</u> : Assessment questions matched to the learning objective	The assessment questions check for the skill mentioned in the learning objective
<u>Engagement</u> : Content presentation style and graphics to engage learners	Providing cues, illustrations, highlighting important points, using an active voice for discussion
<u>Feedback</u> : Responses to learners' performance in assessments or activities	Verbal or visual feedback that guides learners to identify what went wrong, and how it can be rectified
<u>Motivation</u> : Motivate learners to interact further with the content	Motivation can be seen through stars, badges, and visual or verbal warm messages
<u>Context</u> : Relevance of the context used to the learner	The context is relatable to the learners in terms of setting, choice of vocabulary, and examples
<u>Collaboration</u> : Opportunities for the learners for social interaction	Possibilities to enhance anonymous conversation, peer feedback, writing and others
<u>Support</u> : Support provided to the adults to help learners use the product	Support to adults to guide learners to meaningfully engage with the content

3.3 *Technology and Design*

Aside from ensuring an intuitive and easy-to-use interface, effectively used technology can reduce hurdles faced in language learning by children with varying abilities (Berninger et al, 2015). For example, a full-caption video or text would not only benefit learners with hearing disorders but can help all learners to improve their language skills (Teng, 2019). The ease with which the learners can navigate the content offered in the products, and the pace at which they can engage with the content also affect their sense of autonomy, and their learning experience (Reiber-Kuijpers et al, 2021). Tools like Learning analytics dashboards (LADs) help students (and teachers) make sense of their learning by offering insights into their learning patterns. It can help with self-regulation in team activities as well as assist educators to identify cognitive constraints and provide actionable pedagogical support (Zamecnik et al, 2022). The criteria and what to look for in products are represented in Table 3.

Table 3. *Criteria under Technology and Design to check the quality of English EdTech product*

Criterion name and meaning	What to look for in EdTech products
<u>Interface design</u> : Product features that would make the interface meaningful	Intuitive and easy-to-use interface design where the operations can be performed without hardship
<u>Universal design</u> : The features are designed in a way to reach all learners	Presence of full captions in videos, voice-overs for texts to reach all learners meaningfully
<u>Analytics</u> : Features to capture performance of learners	Easy and interpretable format to display learner's performance and areas of improvement
<u>Learner navigation and pace</u> : Features to support self-paced learning	Technology supports learners to explore content at their own pace and select relevant content

4. Designing for different use cases: Additional criteria for consideration

In this section, the aforementioned criteria are extended to PAL and DGBLL English products.

4.1 *Personalised Adaptive Learning (PAL) products for English language*

In an effective language learning curriculum, learners should receive content that meets their interests and learning needs. Adaptive learning systems that recommend articles based on learners' preferences and reading proficiency levels, significantly contribute to better reading comprehension. Personalised recommendation mechanisms help motivate learners and thereby improve their reading effectiveness (Hsu et al, 2013). Personalisation can be offered in multiple ways. For instance, there is a strong effect of providing personalised and motivational messages after formative tests (De Sixte et al, 2020). Personalised feedback that compares the learner's current performance to their past performance can enhance learning (Maier, 2021). Personalisation can also be done by providing content in a context relevant to the learners. Recent innovation also allows devices to provide contextualised content by tracking the coordinates of the learners (Hwang et al, 2014).

4.2 *Digital Game-Based Language Learning (DGBLL) products*

Studies have observed that the 'badge mechanism' in DGBLL, which gives learners instant feedback raises their self-efficacy and enhances their learning of English as a foreign language (Yang et al, 2016). The feeling of being a part of the game, created through sensory inputs such as auditory and visual feedback at the end of each question, can enhance engagement (Sandberg et al, 2014). This can be done by giving learners immediate feedback (both visual and auditory) on their performance. Quality DGBLL products should challenge learners while maintaining a balance between the learner's level and the challenge posed to them (Hsu, 2016; Sandberg et al, 2014). The game's rules should be easy to understand and should not have too many. A learner might get overwhelmed by difficult or too many rules (Acquah and Katz, 2020). Effective integration of competition and collaboration, synchronous and asynchronous, in the product design can be meaningful for learning (Hsu, 2016). Setting up goals, planning and Self-Directed Learning (SDL) is beneficial for learning in game-based settings (Li et al,

2021). Maintaining learners' anonymity and helping them in using *Avatars* and pseudonyms to express themselves is a strategy to improve engagement between learners (Chen and Kent, 2020). It empowers learners to interact with others and have open interactions without fearing mistakes. Additionally, a well-designed game allows learners to interact with it, and have adequate control over the gameplay, game environment and learning experience (Xu et al, 2020).

5. Discussion and Conclusion

The article outlines the evaluation criteria for English EdTech products for ESL or EFL learners. We identify the broad criteria to determine the quality of content, associated pedagogy and technology features but we do not claim that the criteria are exhaustive. Our choice of criteria aims to ensure that the quality of products can be measured but the number of criteria does not deter evaluators. Some of the criteria, such as content accuracy, constructivist approach, and universal design, can be used across country contexts. Others, including language comprehensibility, context, skill coverage need to be contextualised based on the context of the intended learner. We carry out this exercise for the Indian context, as a part of the EdTech *Tulna* project (EdTech Tulna, 2022). Based on these criteria, we developed the *Tulna-English* index, a three-scaled rubric with detailed reviewer guidelines to determine the quality of English language learning EdTech products. It has been contextualised to cater to the needs of learners in India. The skill-coverage criteria base itself on the skills defined by the National Council of Educational Research and Training (NCERT) for each grade and the overall index has been designed keeping National Education Policy 2020 into account. Similarly, language comprehensibility and context have been customised to include examples that are relevant to an Indian learner. The index will be validated through the evaluation of English language learning EdTech products. The contribution of this paper is to help stakeholders identify the features to evaluate the quality of English EdTech products. Similar exercises can be done by other countries for informed decision-making to effectively integrate technology into education.

Acknowledgement

The authors acknowledge the support of Central Square Foundation for funding and partnering in the *EdTech Tulna* project. The authors are grateful to the *Tulna* team members for their comments and suggestions, and to the Educational Technology interdisciplinary program at IIT Bombay for overall support.

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