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Pedagogical potential of immersive technology for English speaking learning

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ABSTRACT

Finding the right resources in teaching learning can be challenging, primarily when some products are mainly driven by profit rather than educational value. Because of the popularity of immersive technology, educators are being challenged to explore the potential of this technology and bring it to fun activities in the classroom. Therefore, this article discusses the pedagogical potential of immersive technology in improving speaking skills of students. By adopting this technology, cognitive skills are obtained, and social skills can develop properly. Technology that promotes students' learning centers and accommodates various learning styles helps educators deal with problems in class. Various kinds of advantages and disadvantages of immersive technology are presented in this article. To take various benefits offered by the innovation of metaverse learning media, readiness in management and facilities need to be prepared for is explained. It recommends the concepts applied in schools to find out the dynamics of the main concepts needed in implementing digital multimodal in English-speaking learning.

Keywords: pedagogical potential, immersive technology, English learning

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INTRODUCTION

The ability to speak the international language fluently has proven to increase personal development, future opportunities, social integration, academic success, and effective communication. High demand for English mastery mostly related to international business, hospitality, research, and global education (Flowerdew, 2022; Irawan et al., 2022; Shrishthy, 2022), in order to communicate and involve in particular interactions. Therefore, speaking becomes crucial for foreign learners to learn and practice at school and everyday life. Constructing and giving meaning through verbal or non-verbal systems is essential in producing oral language. Therefore, communicative performance and other vital elements, such as pronunciation, intonation, grammar, vocabulary, etc., must be mastered. However, many of these aspects are taught conventionally, so students are not encouraged to learn or even motivated to speak. This condition emerges in various phenomena in speaking, such as anxiety, shyness, and nervousness which obstruct students' interaction while speaking practice (Hinojo-Lucena et al., 2020). Many studies and developments have been done to increase speaking skills by using various media and methods (Mufidah & Roifah, 2020; Murtafiah & Muawanah, 2022; Rizal et al., 2022; Yadi, 2022). The use of IT and technological sophistication to assist learning has been intensively carried out to create a different atmosphere for students to create a pleasant learning atmosphere. There are numerous digital technologies involved in education, especially for language skills. Yang et al. (2022) discover that digital storytelling could enhance students` speaking skills and foster creative thinking. It is also similar to James et al. (2019), who found that the essential of digital technology as a medium to attract students` interest in speaking (Sam & Hashim, 2022) was using sophisticated tools with 3D applications for learning speaking skills. On the other hand, technology as a media also supports listening skills such as animation movie, podcast application, and many others (Agarid & Nurzahra, 2018; Siahaan, 2020; Sofiana & Aziez,

2022; Verdugo & Belmonte, 2007) Technology engagement plays an essential role in supporting English language teaching.

The development of technology leads us to a new approach to cybergogy, and even more, the use of technology as the multimodal text does not only revolve around the use of 2 or 3 dimensions but is now approaching the metaverse. Not only presenting visuals and audio but also spatial mode. The use of Augmented Reality (AR), Virtual Reality (VR), Mixed Reality (MR), and Extended Reality (XR) in this digital era attracted the attention of many people in various sectors, especially the young generation. In line with the findings of the research, discourse analysis in social media platforms (Twitter) where the people (mostly youth) share their opinions (Lampropoulos et al., 2022) in total 17,278,040 tweets, 6,820,696 were about augmented reality, and 10,457,344 were about virtual reality. It also reveals that most of the public is positively disposed toward the implementation of immersive technology in general and educational use.

Immersive technology is a term that describes technology that combines the physical and digital worlds, such as augmented reality, virtual reality, and mixed reality. At first, the innovation of immersive technology was highly discharged in the amusement market but today the use of immersive technology began to penetrate the education field. However, although there are many studies conducted to discuss the implementation of immersive technology in technical education such as engineering, pharmacy, and business (Alhalabi, 2016; Farshid et al., 2018; Salem et al., 2020), only few of them discuss the pedagogical potential of immersive technology in language education.

Recently, there has been renewed interest in a new dimension of media. Evidence suggests that the interactive media is among the most important factors for improving learning quality and students' speaking skill (Rahmani, 2020; Rashid et al., 2017; Sherine et al., 2020; Sosas, 2021). Therefore, this paper attempts to explore the potency of immersive technology in improving students' speaking skill. The remaining part of the paper proceeds on the nature of immersive technology, the role of immersive technology in speaking skills, its impacts as well as sophisticated features and various software in speaking learning, and the implementation in English education in Indonesia. The findings should make an important contribution to the field of education specially to develop renewable media in English speaking learning.

DISCUSSION

The nature of immersive technology

Vasista (2022) states that 2018 was the year that AR cultivation took off significantly, bringing AR to the public. Augmented reality, or AR, refers to the dynamic placement of digital information and objects in real-world settings to enhance our perception and understanding. The name comes from the notion that digital data "augments" the "reality" we see around us. Long before the magnificent 2018, Admission, Google.com Glass, and Snapchat were three active AR engines; more recently, Silicon Valley-based service provider Miracle Surge has pushed the boundaries of creating light in body-weight wearable AR and VR glasses, allowing movies to "explore the living room" beyond the TV.

Immersive technology has been widely used in several factors, namely the entertainment industry, social media, and especially in education. Technology such as virtual simulations or augmented reality can provide a safe and interactive environment for individuals to practice public speaking, participate in discussions, or even give presentations (Stupar-Rutenfrans et al., 2017). They can gain real experience in a controlled and repetitive environment, helping to build their confidence in speaking. It helps in developing speech flexibility and adaptability to various communication situations. Immersive technology can be used to teach effective storytelling techniques, visualize elements of the story, and even allow individuals to "live" in their own stories. Some immersive technologies can provide immediate feedback on pronunciation, intonation, and body language (Rashid et al., 2017). For example, AR or VR-based apps can provide visual or audible indications when a user makes a speech mistake. This helps individuals to identify and refine certain aspects of their speaking skills. To find out the differences among them, Table 1 presents the data.

Table 1. The differences between augmented reality and virtual reality

No	Aspects	Augmented Reality (AR)	Virtual Reality (VR)
1	The nature*	A digital and artificial environment, only partially in the backdrop of the real world.	A full of a digital environment
2	Means of operation*	Overlays virtual and computer-generated objects, images, and graphics in a natural setting.	A virtual and computerized artificial environment. It is distinct from the actual world condition.
3	Impact*	It only improves the experience, observation, and understanding of the natural world by using visual objects/ images, artificial smells, sounds, and graphics.	It engages the users entirely in the virtual world
4	Effect*	It allows the interactions between artificial objects and real-world entities in a natural setting.	It created a separate virtual existence that operates without actual dimensions.
5	Device*	*Snapchat Lense, Pokemon Go, and Google Glass	HTCVive and OculusRift or Google Cardboard
6	Illustration*	Projects a busy town with virtual signs placed.	Virtual recreation of a historical era enables the students to relate to the past situation.
7	Quality of display device*	Only adds virtual objects and images to the existing natural world view. It requests low graphic quality.	It uses highly sophisticated computer technology and contains heavy graphics and virtual images.
8	The usage time frame**	Enduring	Temporary (limited)
9	Technology**	Stationary, wearable, projector, mobile	Wearables (HMDs), caves (declining practical relevance)
10	Display Technique**	The video sees through displays Optical see-through display Projector	Video display and projector
11	Mechanism**	Local Presence	Telepresence

Note:
* adapted from Vasista, 2022, p. 2
** adopted from Rauschnabel, et al, 2022 p.6

IT experts developed a combination of the two applications called Mixed Reality. Mixed reality (MR) is defined as a combination of the real and virtual worlds to create entirely new atmospheres in addition to visual images, in which both physical and other electronic things exist and interact in real-time (Kola, 2022). Mixed reality also means a blend of physical and digital worlds, unlocking natural and intuitive 3D human, computer, and environmental interactions. This new reality is based on advancements in computer vision, graphical processing, display technologies, input systems, and cloud computing. Mix of Augmented Reality and Virtual Reality are presented in Figure 1.

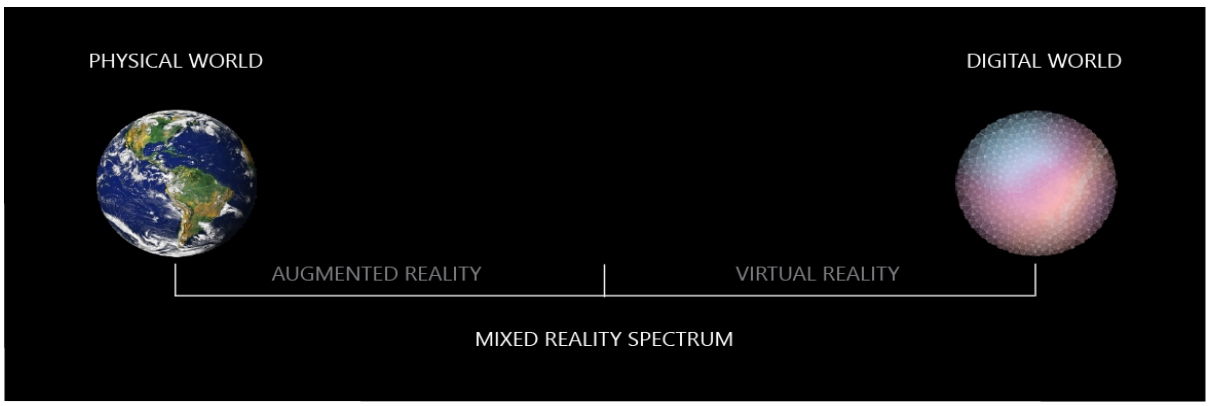

Figure 1. Immersive Technology Spectrum (Adopted from Vasista, 2022)

MR presentations, of course, do not happen. Entirely in the physical or virtual worlds, but it is a crossover between the two, incorporating both augmented reality and augmented virtuality through modern technological interfaces around the user. This kind of cybergoth learning model is able to be incorporated into the PBL (Project-based learning) and requires high-order thinking and critical thinking skills. With PBL, learning positively impacts learning across online platforms ((Rahma et al., 2021). Differing from MR, Kunkel, N., & Soechtig (2016) state that in extended virtual, the virtual and the real worlds come together and share the data. The data are able to coexist and interact with one another. Professionals have always used XR as an abbreviation for extended reality to describe modified or extended reality. Some researchers, such as Rauschnabel et al. (2022) disagree with this naming. It is because scientists use variable X for unknown or unknown variables. AR and VR have some fundamental differences, but many things are still ambiguous between MR and XR. To better understand the differences between AR, VR, MR, and XR immersive technologies. The illustration of the concept of four kinds of new realities is described in Figure 2.

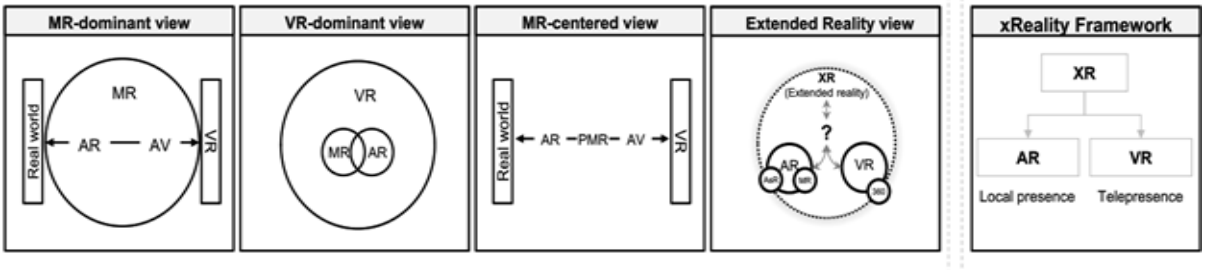

Figure 2. New reality format (Adopted from Rauschnabel et al., 2022)

Note:
AR= Augmented reality
VR= Virtual reality
MR= Mixed reality
PMR=Pure mixed reality
AV= Augmented virtuality
AsR= Assisted reality
360= 360° content

MR combines what is real and what is possible (Farshid et al., 2018), while the definition of PMR is a particular technology that is suitable between AR or augmented reality (a phenomenon of virtuality that overlap with reality) and AV or augmented virtually (a phenomenon that reality overlaps with virtuality) (Flavián et al., 2021).

The role of immersive technology in improving speaking skill

Speaking skill as oral production refers to the ability to produce spoken language. It is one of the fundamental aspects of language proficiency, alongside listening comprehension, reading comprehension, and writing. Oral production involves using vocal apparatus to form words, sentences, and discourse in a spoken form, which can be understood and interpreted by others who share the same language (Remache Carrillo et al., 2019). Effective oral production requires a solid grasp of the language's vocabulary and grammar and an understanding of appropriate intonation, stress, rhythm, and other prosodic elements that contribute to effective communication (Lopez et al., 2021).

Various strategies and methods have been applied to support oral production, such as using authentic tasks (Ramírez Ortiz & Artunduaga Cuéllar, 2018), a project-based learning approach (Remache Carrillo et al., 2019), and form-focused instruction (Chen & Li, 2022). However, the use of conventional methods became a factor in low oral production (Remache Carrillo et al., 2019). Therefore, recent technology plays a part in increasing oral production and providing interactive language learning (Ávila-Cabrera, 2022; Wang & Han, 2021).

Educators, educational policymakers, government, and IT experts, to educate the nation's generation, are now trying to keep up with the latest technology development, not just technology but

how it can help language learners. It is so that the next generation can compete globally. That is why the emergence of AR and VR in the educational setting brings new educational multimodal texts. It is beyond the standard text we knew before. The simplest educational uses of AR involve putting rich digital data, artifacts, and/or interactive objects into spreadsheets or books that are displayed when scanned by a smartphone or tablet. One of the first popular software used by teachers and students for this was Aurasma (Hudaya & Sadikin, 2019), later renamed HP Reveal and now discontinued (Salem et al., 2020). Similar tools include Augment, Blippar, and Zappar (Nadolny, 2017).

Not only just sitting while enjoying AR via book or gadget, but AR can also take students outside the classroom and into real-world environments, thus responding to today's on-site and casual learning trends. The social constructionist element becomes evident when students collaborate on learning paths or games using mobile AR applications in their everyday environment. Creativity and digital literacy emerge when students create multimedia objects to record, consolidate, and share their learning.The presentation of complex senses and the chance to interact related to a theory give more understanding of the concept. About 80% of the information in the brain is visual. AR gives the brain a very intuitive way of accessing knowledge (Dempsey, 2015). AR has the ability to interpose digital information in the real world, especially and interactively. The students are not only allowed to learn but also to share ideas. They can participate in how something works and interact with it at their own pace. In the future, everyone can create, learn and tell stories and collaborate with them.

Nowadays, educational companies are creating learning paths and games that are increasingly providing teachers and students with usable tools to create their versions, including Singapore's LDR (https://www.ldr.sg/) and Rockmoon (http://www.rockmoon.sg/). Platforms that can be used to create such routes are Actionbound (https://en.actionbound.com/blog) from Germany, The TaleBlazer (http://taleblazer.org/), and Twine from the US (https://twinery.org/). The MASELTOV (http://www.maseltov.eu/) project in Europe has done interesting work in this area, resulting in a language learning application.

In various studies, using immersive technology is able to improve students' achievement, such as in vocabulary acquisition (Hudaya & Sadikin, 2019) and engagement (Babich, 2019), and boost autonomous learning. Not only for cognitive skills but also to develop student's creativity, visual learning, and emotional reaction by implementing PBL (Storchi, 2018); AR and VR are also cost-effective applications (Jumani et al., 2022). That is why AR and VR have educational potential that brings many benefits. To discuss more about how immersive technology is used in the setting of speaking classes, below is the explanation supported by the related studies.

How immersive technology improves speaking ability

As visionaries, the advantage of IT development and maximizing its use in the fields is to make it easier to implement. Hurix (2023) proposes five ways how the immersive applications are applied to improve English-speaking skill. First, AR and VR provide safe and affordable training (Koumaditis et al., 2019). These applications are able to create an artificial demonstration as real. Learning or training requires understanding a hazard and how the situation is described authentically. With the help of AR and VR, students are able to understand the situation in more detail; the sense that is used is not only in the form of imagination in reading or drawing. AR and VR also provide opportunities for students to experience, feel, hear, and smell without the risk of accidents.

Second, these applications develop soft skills and expertise. Teaching English for Specific Purposes, for example, related to the tourism world, aims to interact and communicate with the customer (Nayyar et al., 2018). By using real-like-interaction directly supports students to practice speaking English.

Third, it presents a better way of practicing and sharpening skills. By not only receiving information but rather doing it, it believes that it has a retention rate of 75% compared to the lecturing method, with only 5% retention capabilities. Usually, speaking practice involves foreigners; thus, students can interact directly and use authentic sources. This activity requires excessive time and costs. Therefore, AR and VR technologies offer speaking practice through direct interaction with foreigners that feels quite real at a reasonably low cost. A better way of practicing and sharpening skills can be done through avatars or virtual characters available in AR. AR can display virtual objects related to English vocabulary or phrases, allowing users to practice pronunciation, comprehension, and use of words in authentic contexts. Through AR, users can practice speaking English with virtual avatars in

situations such as ordering food at restaurants, interacting with English-speaking natives, or performing roles in everyday scenarios.

AR can improve English pronunciation by providing real-time visual and auditory feedback. Users can use AR that detects the pronunciation of words or phrases in English and provide an immediate response to help improve intonation, accent, and clarity in speech. Several studies showed that AR utilization is able to improve students' vocabulary (Huang et al., 2021; Redondo et al., 2019), which is one of the obstructions to speaking. Students can be more active and explorative in comprehending vocabulary because AR promotes a supportive environment. When students have good vocabulary knowledge, it can ease speaking problems due to a lack of vocabulary. Therefore, students can be more confident interacting with others while speaking English.

Fourth, we know that there are many benefits to applying gamification. Rahmani (2020) stated that the most important benefits are increasing motivation and good performance, developing 21st Century skills, encouraging social interaction and freedom, and increasing student competitiveness during learning. Khambari (2018), in his research, showed that the use of augmented reality (AR) as a learning medium increases students' understanding of the material taught because AR can visualize objects in 3D; thus, it is more engaging. Increased interest in learning makes students more actively participate in the classroom. Through AR, students could get involved with the content they were learning, dissecting it into its parts, exploring their interdependencies, and applying what they learned to new situations. Students would be able to infer the trends over time. It could foster students` analytical thinking skills in language learning (Nasongkhla et al., 2019).

Other advantages of using immersive technology in education proposed by Donally (2018) are engagement, investment, flexibility, and challenges. The most obvious advantage of using immersive technology is developing students' engagement since most students are enthusiastic about trying new technology. Since the exposure to immersive technology is experienced by the students through entertainment and gameplay, they are interested in play-like learning. In order to fit the diversity of the students' learning styles, immersive technology is the perfect media and material to be used. There are many options provided in immersive technology, not only for visual learning styles but also auditory, kinesthetic, and reading/writing learning styles.

Every method, modality, and approach taken will always have positive and negative sides to every decision. Although many advantages can be gained in using impassive ethnology in learning, this technology also has drawbacks. There are weaknesses in this technology, namely aspects of physical risks and aspects of motion sickness (Table 2).

Table 2. The drawback of Immersive Reality

No	Aspects	Augmented Reality	Virtual Reality
1	Physical risks	Collision or accidents through distraction	Collisions through disconnection with the real world
2	Motion Sickness	Rarely applicable	Significant

Potential Immersive applications for enhancing speaking skill

Many immersive technology tools are designed with specific aims for education, but most of them are flexible enough to be adapted and adopted in learning. Although some technologies might initially appear to provide everything users need, students will quickly discover constraints and restrictions which lead them to find other ways to accessibility. Therefore, immersive technology is present to help students access more tools to support their learning, namely app hacking and app smashing, which expect to provide a wide range of digital tools. An example of App hacking that could be used in learning such as Nearpod app WallaMe app, EyeJack app, and others.

The first is Nearpod App. Nearpod is an interactive presentation platform. This app allows students to engage in activities, games, and VR experiences in learning. The teachers are able to create engaging lessons by delivering content in a visually appealing way and receiving student responses in real-time. The AR and VR options to create content in Nearpod provide some of the integrations that allow for creative use. The objects in this app are in 3D or 360 degrees. In Nearpod, students can create, view, and experience various immersive tools while responding and collaborating simultaneously. Based on the various interesting features of the Nearpod app, it stimulates students to gain pleasing experience by interacting with others in speaking activities (Anggoro et al., 2022).

The second app is WallaMe App. Wallace is the application of a scavenger hunt, where the tasks are to find the correct location and find the particular virtual object. This app allows individuals to leave public or private messages for people that arrive in a specific place. The anticipation of receiving the message after searching for the right location adds to the enjoyment and creativity of messaging.

The third app is EyeJack App. Eye jack is the application that brings the 2D to life. This can be used in greeting card materials in order to create creative crafts while students also learn speaking or other skills of English.

Besides the app hacking, there are some app smashing, which provides other experiences of an immersive atmosphere. App smashing is the process of combining two or more apps to create a project or accomplish a task.

Some popular app smashings are MERGE Explorer, Flipgrid, FaceReplaced, PuppetMaster, YoPuppet, and LightUp. Merge Explorer is a free app that encourages students to give feedback and responses. The benefit of this app is improving the students' enthusiasm in sharing their stories in video format. This application supports students' enthusiasm in practicing speaking and increasing children's self-confidence through fun things. Then, the students could respond to the video and communicate in Flipgrid, FaceReplaced, PuppetMaster, YoPuppet, or LightUp.

The implementation of immersive technology in English education in Indonesia.

The development of immersive technology in Indonesia is still in the introduction stage, even though this technology has pedagogical potential in learning and has many advantages. Therefore, further research and development is needed. VR technology in education starts at the university level, where VR is utilized in simulation learning, such as engineering. This technology is then increasingly being used during a pandemic. It is done to facilitate students' understanding of field practice, which is only possible to do independently in their respective homes if going to campus. This is done by Yogyakarta State University, for example, in the Faculty of Engineering (Humas, 2021).

VR technology then penetrated high school and junior high schools. Quoting from Detik.com (Putri, 2020) that there have been a number of schools in Indonesia that have implemented VR technology at the high school level. In Bali, there are two schools: SMAN 4 Denpasar and SMKN 1 Denpasar. Several schools then followed the application of VR in big cities such as Jakarta, Bandung, and others. Moreover, socialization and workshops related to VR have also started at the junior high school level. Yogyakarta Muhammadiyah University, as a Community Partnership Program, is developing VR for English teachers at the junior high school level (Digital & Media, 2020). The topic used is descriptive text.

As previously explained, immersive technology provides students with a deeper understanding of ongoing learning. In its implementation in English Education, this technology helps students learn the meaning of texts such as narrative, procedure, explanation, and others. Students are not only presented with written text but feel it with experience-based text. Many junior high school students may need help understanding the meaning of abstract vocabulary only through writing. With AR, students are able to understand vocabulary in real contexts by learning by doing. In language learning, experience is believed to be able to place new vocabulary in long-term memory (Nemati, 2010) compared to only text-based teaching. In addition to increasing vocabulary, the application of immersive technology in training students' speaking learning is the most interactive method, promoting a learner-centered environment and learning by doing (Altun, H & Lee, 2020). Interactive learning places students in conditions as if they are authentic, making students play a leading role in speaking in role-play activities.

However, only a few schools in Indonesia apply this technology to learning. In a study by Li et al. (2016), the budget becomes a significant concern when stakeholders are trying to build a more English Engaging environment. This is also an obstacle to implementing immersive technology in Indonesia. Therefore, research on the development of immersive technology that is practical and economical needs to be carried out so that it can be immediately massively implemented in Indonesia to get more significant benefits.

CONCLUSION

Immersive technology is a technology that blurs the boundaries between virtual and real world. The results show that the use of immersive technologies can support students' speaking skills because it provides a huge opportunity to gain direct feedback based on their performance in speaking activities

such as pronunciation, intonation, or particular phrases suitable with the context. Not only that, but AR, VR, and MR as an interactive media of immersive technologies are also able to enhance students` motivation to engage in the learning process. Therefore, they are confident to interact with others which supports speaking skill as well. In summary, the use of immersive technology is believed to improve students' speaking skill. The construction of an immersive environment that provides an active and interactive teaching method in a more accessible and engaging way. It promotes students' digital skill in the Industrial Era 4.0. Based on the results above, it can be concluded that immersive technology development in learning, especially speaking, has not been well-conducted yet. Therefore, it needs more support from government and educational institutions to develop educational-based immersive technology to be applied.

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