Games Used in Engaging Virtual Environments for Real-time Language Education

IO9: Tool for Customising App Content

EU FUNDED GUINEVERE PROJECT (2017-2019)

IO Number: 9

IO Name: Tool for customising app content

Description:

The University of Istanbul will take the lead in this IO to develop a vocabulary training app with gamified and social aspects which allows teachers to add their own content using their mobile devices. This enables teachers to prepare individually for their lessons and reuse aspects and results from other areas of their own games.

One of the benefits of virtual worlds is that a huge variety of settings, scenarios and real-life locations as well as imaginary regions are available for taking pictures, providing permission has been granted to do so. Additionally, a number of objects can be purchased for relatively small amounts in Second Life. OpenSim environments, however, are more limited and some items may need to be produced manually.

The teachers' learning content will be images, for example, taken in virtual worlds, with the appropriate vocabulary and example sentences. Teachers can provide the mp3 audio file for each word. They can also provide their own videos (e.g. scenario-based language learning) as a bonus for their students.

This approach will produce a tool or interface which allows the teachers to be able to add their own content to the database in order to grow app content. The content may be in form of images, vocabulary, example sentences and audio files.

At the end of the project, this app will be available for teachers who want to create their own games in virtual environments. An approval process as content deliverer will be set in place to validate the content added to the app.

Dissemination Level: Public

Signed off by: Project Coordinator

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Table of Contents

List of Abbreviations

BECTA	British educational communications and technology agency
BYOD	Bring your own device
CALL	Computer-assisted language learning
CLIL	Content and Language Integrated Learning
CMC	Computer-mediated communication
DES	Department of Education and Science
DS	Digital Schools
EFL	English as a foreign language
ESL	English as a second language
EU	European Union
FL	Foreign language
GUINEVERE	Games Used IN Engaging Virtual Environments for Real-time language Education
ICALL	Intelligent computer-assisted language learning
ICT	Information and communication technologies
L1	First language
L2	Second language
MALL	Mobile-assisted Language Learning
MMOG	Massively multiplayer online games
MOOC	Massive Open Online Courses
MOODLE	Modular object-orientated dynamic learning environment
OECD	Organization for Economic Co-Operation and Development
OFSTED	Office for standards in education, children's services and skills
PC	Personal computer
PISA	Programme for International Students Assessment
SLA	Second language acquisition
TELL	Technology-enhanced Language Learning
TL	Target language
TPACK	Technological pedagogical content knowledge
UNDP	United Nations development programme
VLE	Virtual learning environment
WELL	Web-enhanced language learning

List of Figures

List of Tables

1. Rationale for an App to Provide Gamified Language and Vocabulary Training

1.1 Theory of Learning with Multimedia

Wang et al. (2013) states that in learning applications, multimedia materials such as images, texts, audios, 3D objects, 2D or 3D animations and videos are brought to use depending on the learning objectives they have. Retention of knowledge as well as active learner participation are enabled through these multimedia materials which are also well designed for interaction. One theory is framed with these multimedia learning environments by Mayer (2001) and is guiding the design processes of such kind of applications. Multimedia Learning Theory also is in close relation with the cognitive loads of learners while interacting and learning in such environments Paas, Renkl and Sweller (2003) state that cognitive load theory is dealing with creating new teaching methods to help individuals by using their information processing capacity in its great efficiency. Learning with Multimedia Apps provide learners with many opportunities as well as ubiquitous learning. Multimedia apps also are designed upon the principles of multimedia learning theory have an important potential for decreasing the cognitive load of individuals and providing an effective learning process (Plass, Moreno, & Brünken, 2010). In addition these environments give opportunity to students to see materials to analyze language from various perspectives and to experience language while learning. Thus, a more permanent and effective learning occurs where the students are more active (Chen, Chi, Hung, & Kang, 2011; Dunleavy, Dede & Mitchell, 2009; Wojciechowski & Cellary, 2013; Wu et al., 2013).

In this context any pursuit to create an app requires the tech developers and experts to take learning and learners into account in the design process. The design process and the learning process needs to overlap and parallel for the optimum outcome. Meyer et al. (2014) recommends three principles, that are also named "Universal Design for Learning (UDL) principles", to consider in this pursuit.

1. Provide multiple means of engagement.
2. Provide multiple means of representation.
3. Provide multiple means of action and expression

Meyer et al. (2014) states that motivation is a key factor in the learning process. The first principle of providing multiple means of engagement caters for sustainable and varied tools for motivation in learning. Students are very different from one another and they are not motivated in the same way, educators and materials also need to be varied. Students' needs and preferences in the learning process are also very different, in this respect, the teachers and the materials should employ strategies to enhance those in the learning process. Keller (2010) also states that students are also motivated by the challenge in the learning process but the challenge needs to be coming from the learning materials itself and not from obstacles in the learning process.

When it comes to the second principles providing multiple ways of representation, it could be explained as providing the content in more than one ways and channels. Content can be reflected in two distinct ways: as information or visualized. These two distinct phenomena should work together for a successful learning to occur. For example information could be general and in writing and visuals could be for more specific situations and in other forms. Learners need to see general information as well as how to use this information demonstrated in specific situations with real life tasks. This is even more vital in language learning as language comprises of not only grammar and vocabulary but also this information applied in more specific contexts and functions. Knowing about the language and using the language as a skill is the essence of quality language education. Trying out the information is indispensable part of language learning. Real life usage is as important as knowing about the use of grammar and vocabulary. Knowledge is in itself declarative as well as procedural. The materials that are created with multimedia should cater for both too.

This brings us to the third principle of provide multiple means of action and expression. Learners need to have various and comprehensive opportunities to use the content and information they learn. Any material should enhance authentic experience with the language. Multimedia apps could give diverse ways of reaction to linguistic content.

Under the light of the Multimedia Learning Theory and Universal Design Principles we have created the Gistory App to enable new ways of providing language content as well as new ways of language practice. See Table 1. to check how language work could be projected in Multimedia Learning Instructional Design in the form of both knowledge and skill work. Learners of foreign languages need to learn words in context and in multiple ways, for example: presentation (tell), demonstration (show), recall (ask), and apply (do). In our Gistory App the language and vocabulary is presented following these strategies as well.

Learning Outcome	Remember Information (knowledge)	Apply Information to Portrayal (skill)
Information about	Remember the description of an entity.	Given a description recognize a given instance of an entity.
Parts-of	Remember the names and description of the parts of an entity.	For a given entity, locate the parts in the context of the whole.
Kinds-of	Remember the definition—the property values that define a class of entity.	Classify examples—identity entity portrayals that belong to a specific class of entity.
How-to	Remember the steps—a sequence of action names or descriptions.	Do the task—execute the actions in the sequence.
What-happens	Remember the name, description, conditions and consequence for the process.	Given the conditions predict a consequence or given a consequence find missing or faulted conditions.

Table 1. Instructional Design for Learning (Merrill, 2001).

1.2 Gamification and Language Learning

Sailer, Hense, Mandl, and Klevers (2017) believe that the concept of "gamification" involves the concepts "game", "elements" and "design". In gamification there is a goal to be achieved, rules to be obeyed, feedback that is provided instantly, and is voluntary. The gamification is not for entertainment purposes but learning and is used in non-gaming contexts. Gamification also encompasses the design concept which is using game design for learning contexts but not only gaming ecology.

Kapp (2002) suggests a list where typical game elements include goals, rules conflict, competition, cooperation, time, reward structures, feedback, levels, storytelling, curve of interest and aesthetics. Likewise, Werbach and Hunter (2015) also provides a list of basic elements of gamification that are in parallel with Kapp (2002). For Werbach and Hunter (2015) mechanics of a game are the basic processes that guide users to engage with the content while continuing to drive the action forward. Specifically, the mechanics elements include challenges, chance, competition, cooperation, feedback, resource acquisition, reward system,

transactions, turns, and win states. Table 2 shows the game mechanics that need to be taken into consideration while designing gamified apps.

Game Mechanics	Definitions
Challenges	Tasks presented that prompt the player to generate a solution.
Chance	Element(s) of possibility/randomness in a game.
Competition	Intuitive mechanic where one player (or a team) wins whether another (or a team) loses.
Cooperation	Player(s) who works best together to achieve a specific goal within a game.
Feedback	Providing information on how a player is performing.
Resource Acquisition	Acquiring useful or collectible items as the player progresses.
Reward system	System to motivate player to accomplish a quest.
Transactions	Trades between users, (they can be either direct or through an intermediary).
Turns	Sequential participation of players.
Win States	Objectives that make one player the winner (Note that it is also possible to have Draw and Loss states).

Table 2. Game mechanics and related definitions based on Werbach and Hunter (2015)

The Gistory App created in the context of GUINEVERE Project has also covered some of these elements. For example, challenges are presented to the students in the form of questions to be answered or choices to be made to proceed in the app. Chances are always part of the chunks created for this app for language learning and practice. Cooperation is also enabled as the creation of Gistories is possible in two different modes. One for teachers and one for students. Students can create their Gistories in the form of a group work and teachers can also share their Gistories with their colleagues and other teachers. Students can get instant feedback based on their own choices. The motivation is based on intrinsic motivation on completion of the Gistories but not on external rewards. Users, both teachers and students can exchange and share their final Gistories on the App.

2. Overview and Planning

Gistory App is an app that students and teachers can use to create gamified interactive stories enriched with multimedia (audios, videos, pictures and gifs) as well as recycle vocabulary.

2.1 Teachers

On an editorial screen and forms, the language teachers can create interactive stories with any videos or videos recorded on 3D VLEs, any pictures or pictures with avatars. These individual chunks in the form of videos or pictures can be linked to language text and also other pictures or videos with audio. Then finally all of these can be linked by the app and create the GISTORY, which later can be shared and viewed by the students. These gistories can be shared with other teachers and there can be an inventory for those that the teachers can search and use with their students.

2.2 Students

Students can view the gistories and play with the content their teachers created. The students can also create their gistories by interacting in 3D VLEs and they can link those to language text or voice recordings. Teachers can give those as homework or differentiate the process and product of their lessons. Students can also share their products with fellow students and also in the inventory with the larger environments.

2.3 App Specifications

The Gistory App works on Android and Android Smartphones.

3. Audience

- Foreign Language Teachers who want to teach languages in regular schools and also gamified interactive environments, other area teachers can also make use of the app if their content requires content introduction.
- Students (5th -12th grades) who learn languages in regular schools.

4. Glossary

Gistory - Every gamified interactive story will be named as a gistory.
Chunks- Every gistory will be built upon interactive story chunks similar to screens which we call chunks. Chunks will be connected to each other in an hierarchical structure.
Every chunk will include these optional parts:
- A title
- A text
- An audio
- A video
- A GIF

A chunk will have questions/directive options to ask user how he/she is going to proceed and according to answer another connected chunk will come up on the screen.

Figure 1. "Visual from the Gistory App"

5. Scenarios
Here are two real life stories of how actual (stereotypical) people can use them. There are two scenarios, one from teacher's perspective and the second from the student's perspective:

Scenario 1: Juan - Teacher
Juan is an English teacher in a Spanish Middle School. He knows that his students are getting bored by usual homework and wants to create an interactive gamified story in which every student will have his/her own story/challenge and share with his/her friends and family. During the path of the story he aims to give some words to enrich students' vocabulary.
Title: The Story Behind My Avatar
Theme: Creating a narrative with 10 words the teachers provided.
Path: Students go into a 3D VLE and hunt for places to record their gistory and then create links between environments and upload their first video. Towards the end of the gistory their friends need to choose among couple of options to follow the narrative. The teachers can also add vocabulary exercises before the gistories or between the scenes.
Chunk: According to the selection the story goes until the students cover all 10 words.

Scenario 2: Cindy - Student
Cindy is a student in a middle school in UK. Her Spanish teacher gave her a project assignment about shopping in Spain. She doesn't want to create a usual presentation, she wants to impress her friends and her teacher. She thinks about a story based game but she doesn't know have a competency on programming and searches for an app to create stories and she finds in app store an app called Gistory. She creates following gistory:
Title: "Mercat de la Boqueria"
Theme: Presentation of the shops and goods at the market
Path: She first picks a picture of the entrance of the market and gives some information on the market in audio,
Chunk: Next picture or video is about the market and the raws where the different kinds of food is sold. She makes her friends choose a path and food type like poultry, seafood, vegetables etc.
Chunk: In this option she introduces different and exotic kinds of seafood and etc.
Thus it goes as much as Cindy is satisfied with her presentation.

6. Themes
In order to give users different design options, Gistory can have these themes, the themes can be varied according to the objectives of the lessons.

- Forest
- Space
- City
- Mystery
- Fun
- School
- Numbers
- Science
- Restaurant
- Class
- Narrative
- Beach

7. App Elements
Audio: Upload/Embed (we should think about server capacity)
Videos: Embed Youtube, EBA (In Turkey Youtube and other media providers are not allowed in schools) videos.
GIFs: Upload/embed
Pictures: Upload/Embed (we should think about server capacity)

8. The Product and How it Functions
1. Splash screen was created. The Splash screen is the full screen that opens when the app opens and features the logo of the app as well.

Figure 2. "The Splash Screen"

2. After the Splash screen a "Walkthrough" was added. The Walkthrough gives information about and describes the Gistory App in three steps. The Walkthrough appears each time the app starts but the users can also choose to click on "don't show again" option and the stop this function.
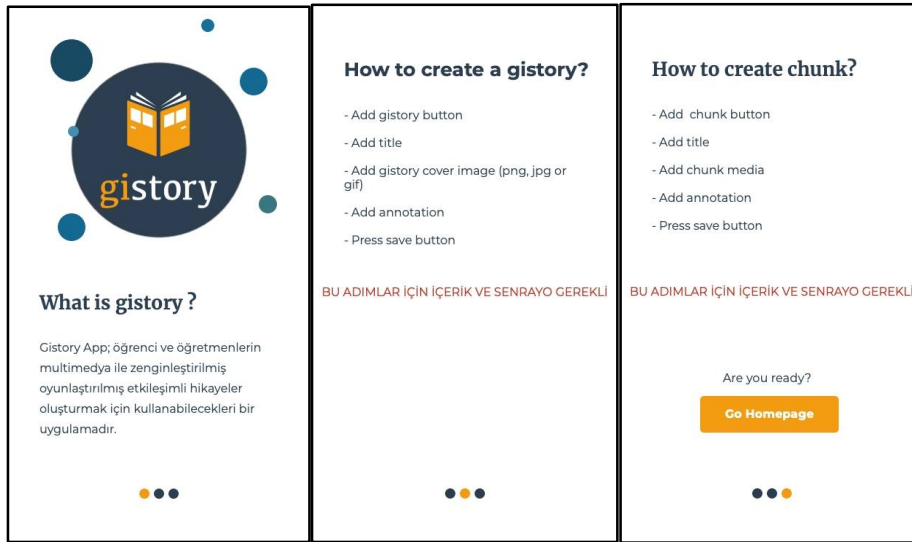
Figure 3. "The Walkthrough Screen"

3. "Login/Register" screen is created. The users can register and log in from this screen. Only the registered users can make use of the app. Users can also retrieve the forgotten passwords with an automatic e-mail from this screen.
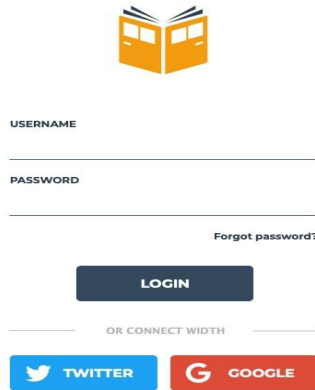

Figure 4. "The Login/Register Screen"

4. The "Main Page" was designed. The main page showcases the featured gistories. When the teachers choose and click on a gistory they can see all the information about the gistory. Afterwards they can start reading the gistory.
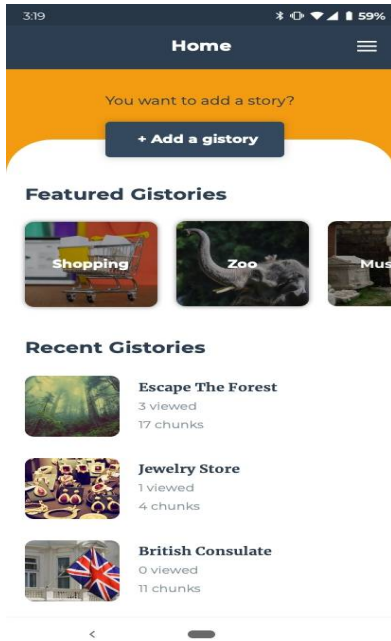
Figure 5. "The Main Page Screen"

5. Chunks were added to the Gistory App. "**Drag and Drop**" type of vocabulary section as added. This mode can used to assess students' knowledge of the vocabulary and their progress. "**Multiple Choice**" type of questions were added, thus students can be assessed for the comprehension of the content of the gistory. "**History**" feature was added, this enables users to access the gistories they experienced before. "**Favourites**" section was added. In this sections users can like the gistories and add them to their favourites and access them later.

Figure 6. "Multiple Choice Screen"

6. "**Definition**" feature is added. This feature will help users to add definitions to vocabulary they choose throughout the texts.

Figure 7. "The Definition Screen"

7. Chunks can be added inside the app from the screens that are created for the chunks.
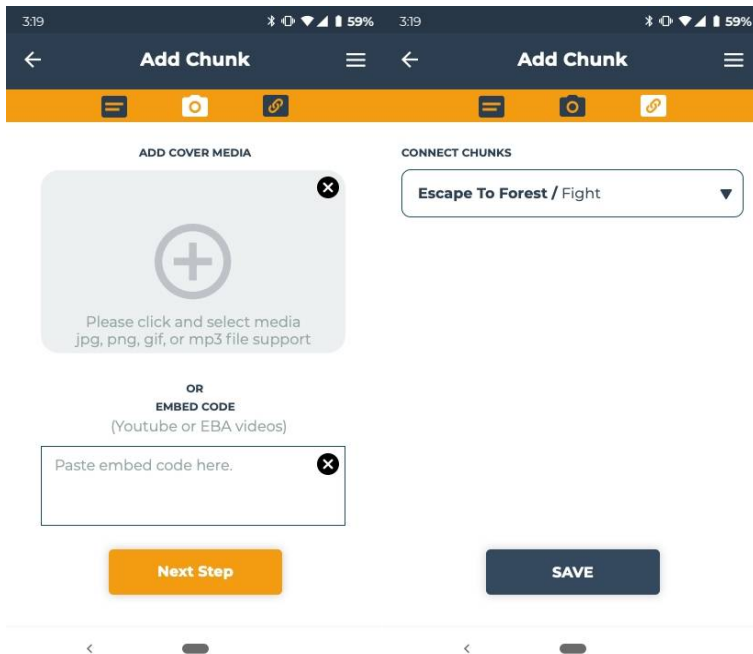

Figure 8. "The Chunks Screens"
The Gistory App can be downloaded from Google Play Store.

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