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1 EXECUTIVE SUMMARY

This is one of two deliverables delivered in M24 of the MASELTOV project by COV, who are leading the development of the serious game. In this deliverable, we focus on the use of avatars and characters in the serious game as a basis for persuasive learning. By comparison, D7.4.1 takes a broader view of the context of their use and overall design of the game as a whole.

Our deliverable covers a number of key themes relevant to the design of avatars and characters used in a serious game to support immigrants. Following a theme common to games of empowerment, our narrative places the player as a hero who needs to interact with and understand two disparate cultures in order to reconcile and resolve a - literal - cultural split. Hence, rather than attempt to create avatars which reflect, and risk stereotyping the target audience, this approach allows for a fictional narrative to be build whilst firmly grounding the problems faced by the player in a real-world context. Through the fictional narrative, the player is required to travel, find employment, seek medical care, shop, and undertake work and social interactions whilst transitioning between different cultures.

The core activity required to realise this has been the process of writing dialogues which simultaneously meet three criteria: they must be compelling, educational, and suitable for the wide range of cultures represented by MASELTOV's target user base.

2 INTRODUCTION

The term "persuasive assistance" implies a need to motivate and engage the learner. In the context of MASELTOV, the challenge faced is to "persuade" immigrants from a diverse range of cultures and countries of origin to develop their cultural competencies and integrate with the society of their host country. Successfully addressing this challenge requires a number of questions be considered: How might we convince the non-integrated immigrant that engaging in cultural integration activities is worthwhile? Assuming motivation exists, how can we aid the immigrant and support their learning in a persuasive fashion? Finally, and most relevant to this deliverable, how can technology be applied to resolve these problems?

Section 3 presents a background on the use of avatars, games, and dialogic interactions as a basis for both transferring knowledge, and developing competencies. Noting that careful use of storytelling to achieve empowerment, engagement, and educational objectives is a useful tool for creating persuasive, motivational learning experiences, Section 4 goes on to outline the narrative design process adopted for the MASELTOV project, realised in a serious game extensively using dialogue-driven interactions as a means to progress and transfer cultural learning outcomes. The developed narrative draws upon these interactions to present the player with challenges under clear themes such as jobseeking, travel, shopping, and healthcare, but does so under a fictional backdrop, allowing for experimentation and abstraction.

Section 5 describes the development methodology for the individual dialogues created within the narrative arc outlined in Section 4. Important here is the involvement of individuals with a wide range of background and expertise: NGOs, game designers, educational designers, and

immigrants themselves are represented in a collaborative authoring process. The technology used to support this is also outlined, with an XML schema defined to create dialogues in a machine- and human-readable format suitable for editing and authoring by non-technical experts. The importance of localisation within the translation process is also noted, as engaging narrative often draws on more culturally-sensitive material, such as humour or irony, than might be expected of more formal learning materials.

Examples of dialogues created are illustrated in Section 6. In concluding, this deliverable notes the importance of continuing under the development methodology noted in Section 5 in a collaborative authoring process which ensures the engaging, motivating powers of storytelling are harnessed, yet balanced carefully against learning objectives. A technical prototype APK of the serious game illustrating developed avatars and content accompanies this deliverable. In concordance with the amended Description of Work, a single prototype game is provided combining the outcomes of T7.3 and T7.4.

3 BACKGROUND

The use of intelligent virtual agents and avatars has rapidly gained momentum as a field of study. A long-term vision here is the "virtual tutor", a synthetic individual capable of interactions identical to a real-world tutor. As such, we might propose an educational variant of Turing's Test as an ultimate goal: if the learner cannot distinguish between real and synthetic tutor, has our objective been achieved? In the context of knowledge transfer, and assessment of learnt knowledge, this is not an ambitious goal. Simply having a machine undertake summative assessment of a multiple-choice questionnaire and return a grade to the learner is a technically trivial task, and with a degree of obfuscation could be seen to "replace" the tutor. It is the higher levels of feedback, however, that challenge technologically-driven solutions - a competent tutor would translate summative assessment into formative feedback, identify students who are struggling and offer additional support, and ensure transferred knowledge can be readily applied by students. In previous work (Dunwell & de Freitas, 2011), we noted the levels of feedback posited by Rogers (Rogers, 1951) had steadily increasing technical demands, predominantly in the areas of machine learning and artificial intelligence.

To describe these levels in more detail, following the knowledge example given above, Rogers suggests interpretive, evaluative, supporting, probing, and understanding levels exist, with increasing degrees of challenge for the tutor, and correspondingly decreasing frequencies of use. This is mirrored in the technological requirements (Dunwell & de Freitas, 2011): to interpret *why* a learner struggled with a task is a substantially more challenging process than determining *if* they struggled. Supportive and probing levels of feedback require interaction with the learner in a two-way process, identifying shortcomings in skill-sets or understandings and proposing actions in response. If we are to apply technology to address the shortfall in these deeper levels of feedback, rather than simply provide lower-level feedback, then we must seek to understand why the learner is struggling or demotivated, rather than simply determine this is the case.

Many applications of avatars and intelligent virtual agents in the learning process, however, have struggled to access these higher levels of feedback. Application of technology such as haptics (Spanlang, Normand, Giannopoulos, & Slater, 2010), or biofeedback (Murray, Hardy,

Spruijt-Metz, Hekler, & Raij, 2013) have shown rich technical potential to create more immersive and pervasive systems, but done little to translate this to concrete improvements in the learning process. The development of a persuasive avatar to provide feedback illustrated the challenges in technology acceptance (Ruijten, Kort, & Kosnar, 2012), with a qualitative assessment showing some learners uneager to accept assessment and feedback from a synthetic character. In fact, striving for realism and agency in virtual characters may be of limited value, as agency and persuasive power have been shown to bear little correlation (Midden & Ham, 2012). In introducing a character, it could be argued, expectations of learners change from requiring a system provide clear data, used as a basis for independent learning, to expectations of responsiveness and interaction. If this responsiveness fails to manifest, then learners may disengage with the system and lose the benefits of the data as well as the intended additions of the avatar.

Other studies have shown promise in terms of engagement, however, with a randomized control trial demonstrating interactive virtual agents to provide a more effective learning experience than video recordings (Ceballos, 2010). If we seek to augment the learning experience, rather than replace the role of the tutor, with an intelligent agent or avatar, studies have shown potential in a wide range of areas. Behavioural realism can translate to social effects (Putten, Kramer, Gratch, & Kang, 2010), with increasing levels of fidelity naturally increasing the social impact. Topics such as autism have seen considerable attention from researchers seeking to explore how identity and social dynamics might be impacted by the use of avatars and intelligent virtual agents (Konstantinidis, Hitoglou-Antoniadou, Luneski, Bamidis, & Nikolaidou, 2009), and exploring this for more general populations remains an interesting topic of research.

Understanding learners' affect and emotion in a virtual environment is an additional topic of relevance to avatars. (Ailiya, Shen, & Miao, 2010). Returning to Rogers' model of feedback levels, gaining some insight into the affective state of the learner offers the potential to provide supportive and probing feedback more effectively. However, modelling emotional state is seldom as complex a task as ascertaining it: to ask a user to self-report their emotions or affective state is unlikely to yield an effective outcome, in part due to the difficulty this places on the learner to reflect upon and objectify their feelings, and in part as overconfidence or misunderstandings may lead to positive emotions despite poor learning outcomes. Designers, therefore, must design to engender positive affect during system use, for example along principles such as flow (Cziksentmihalyi, 1997). This implies a need to constantly balance task (or game) difficulty against learners' perceptions of their ability; too trivial a task for too long and the learner becomes bored, too challenging and they become anxious or frustrated. A potential role for avatars exists here in reinforcing learners' ability perceptions and providing supportive feedback, whilst stimulating engagement.

Agents have also been shown to be recognised by students as being as effective as virtual teachers (Ashoori, Miao, & Cai, 2007), though it remains unclear if the factors in this recognition are predominantly functional, aesthetic, or pedagogical. An evaluation of the SPELL (Spoken Electronic Language Learning) system demonstrated that embodied virtual agents could augment the language learning process (Anderson, Davidson, Morton, & Jack, 2008), pointing to the ability of the agent to provide a greater degree of contextualisation and meaning to conversations as a factor in its efficacy. This is of relevance to MASELTOV, as whilst the game seeks to provide a basis for cultural rather than language learning, the overlap between these two competencies and the role of contextualisation in both suggests avatars have potential to be utilised in a similar fashion.

Moving to the theme of game-based learning, a challenge faced by many serious games is that game-based educational tools are often developed by instructional designers with less frequent representation from an entertainment gaming perspective. Consequently, rather than generating an entertaining game, productions may feel too focused on the educational element, with little synergy between pedagogy and engagement (Van Eck, 2006). Complaints against these "technical" tools means they fail to motivate (Prensky, 2003), and if a player is not motivated enough to enjoy the game, they are less likely to be immersed and take any educational meaning from it. The challenge of designing a serious game is developing a learning tool that is immersive, thought provoking and fun for the player as they develop or improve their skills as a result of playing, skills that they can then apply in the real world with confidence (Rankin, McNeal, Shute, & Gooch, 2008).

Learners who may dislike or avoid challenge in the classroom will strive to master a game over a period of time if there is some challenge in gameplay (Breuer & Bente, 2010). This means that a more challenging game can motivate the player as a learner, more so than, for example, technical or theory-based simulation games. To produce a serious game that is both challenging and aids the player's learning, Van Eck (2006) suggests that something must be produced which is comparable with off-the-shelf games, which already teach the necessary skills to win the game. Van Eck goes on to write that perhaps the top genre for this is adventure games, which are best for the encouragement of "hypothesis testing and problem solving". A game with frequent problem solving tasks, which allow the player to make important decisions is, as Van Eck describes, immersive. An immersive game draws the player in, ensuring they are fully engaged, thus maximising educational potential. Additionally, the narrative-driven style of adventure games develops a story, an element that adds additional appeal for the player (Oblinger, 2006).

Exploring further the notion of using dialogue for learning, Beauvois and Eledge (1994) studied how foreign language students use computers to bolster their learning, by making effective use of MMORPGs. Using such a game as tool for learning allows the player to practice their skills in a non-threatening environment, and such an environment is similarly important for a learner who is becoming aware of cultural differences. Rankin et al. (2008) concur that using MMORPGs is effective for learning, saying that such games provide sufficient motivation and opportunities for learners of a second language to comfortably practice and gain aptitude of their new skill, as the player learns by being an "active participant" opposed to a "passive observer". Another benefit of using MMORPGs is that, in using a dialogue-driven style, the player attains immediate feedback from their choices (Beauvois & Eledge, 1994; Rankin, et al., 2008) feedback being an important factor of the learning process. Support of the value of dialogue-driven games in learning is clear in the above research, thus providing necessary evidence that a game that is immersive and fun, thus educationally beneficial should be one developed using a dialogue-driven model.

In view of this literature, a route which can be explored for persuasive learning is the creation of a game which seeks to engage the player through dialogues with virtual characters. Achieving such engagement whilst satisfying the criteria of a successful game requires consideration also of game elements, and how they may feed-in to the overall design of the persuasive learning experience. Several means for providing persuasive learning through a game can be suggested:

- Creating a compelling gaming experience, which embeds the learning content within the game such that the game mechanics and narrative engage the learner and motivate them to play "for fun" as well as for educational purposes;
- Using characters which, in view of the technological constraints of providing suitable feedback to the player as noted in this section and limitations of the mobile platform, provide interactions whilst scaffolding an experiential learning experience: the player experiences cultural differences through interactions with virtual characters, and can then delve into the other services within the MASELTOV platform to learn more formally about how to understand and develop cultural competences;
- Using "gamification" elements such as scoring and points to further motivate and persuade the player to play the game and utilize other MASELTOV services. It is important to note, however, that a score alone is unlikely to be intrinsically motiving: rather, the points must be attributed a meaning. Two common techniques exist here; using social mechanics to give points a value as social capital, allowing users to compare scores, collaborate, or compete (Simies, Redondo, & Vilas, 2013); or using points as a means to unlock content to reward the player (Easley & Ghosh, 2013). Describing points as "currency" can also reinforce their perceived value (Nah, Telaprolu, Rallapalli, & Venkata, 2013).

Hence, in the following sections these concepts are expanded upon in terms of their impact on the design of the MASELTOV game and subsequent implications. Section 4 details the narrative design of the game, which seeks to create a compelling story to engage the player; in Section 5 we describe the use of avatars within the game to provide a persuasive learning experience. Further details on the currency system can be found in D7.4.1.

4 NARRATIVE DESIGN

Narrative can be a powerful tool when seeking to create serious games, as it can be linked to both pedagogical elements, with the "moral" of the story a desired learning outcome, and fictional elements, both to provide a degree of abstraction, and allow the balance between education and engagement to be achieved (Molnar & Kostkova, 2013). Section 4.1 firstly defines the objectives of the game, and rationale behind the narrative presented in Section 4.2. The narrative requires the player interact with characters, and the design process for these characters and their dialogues is presented in Section 5.

4.1 OBJECTIVES

The topics covered in the game are ones that are presented in everyday life, defined in the initial stages of the MASELTOV project; they are travel, healthcare, shopping and jobseeking. In an unknown environment, a person may struggle with these tasks, especially if there is a difference in cultures. If things are done differently to how a person is used to, they may have to make enquiries and rely on other people to assist them with day-to-day activities or challenges.

- With travel, a person may have to ask for help from staff at stations or ticket offices, or ask locals for the best means of travel and routes to prevent getting lost.
- A healthcare system may operate differently to how a person would be used to, and they may find themselves having to make enquiries if they are unsure how to receive the most appropriate healthcare.

- For shopping, whilst most experiences are the same, a person may notice differences in how items are obtained, how stores operate and how to pay.
- Finally, to earn a living a new place a person may have to find a job. If the person does not know anyone locally with available opportunities, they may have to find job agencies to assist them in their search, as well as going through the interview process.

When visiting somewhere new, a person may notice that cultural differences mean that the above topics are approached in differently; this game aims to give players an insight as to how approaching these topics can vary through dialogue-driven interactions. One option for narrative design is to take the real world story of an immigrant and attempt to replicate it as a game. However, this would have two limitations: firstly, the narrative itself could prove difficult to translate to a compelling story. Secondly, any limitations in fidelity may be quickly picked up on and criticised by learners, e.g."That's not how it is in my experience". Fortunately, previous studies have shown that basing a narrative more strongly in fiction need not compromise, and can in fact enhance learning outcomes (Mehm, Gebel, & Steinmetz, 2012; Rowe, Shores, Mott, & Lester, 2010), as abstraction of problems and higher levels of engagement can lead to positive outcomes.

Hence, a fictional narrative is proposed, however, the learning requirements (specified in D7.4.1) require this fiction is carefully authored with consideration of the elements which have been shown to work effectively in a serious context. Empowerment is a recurrent theme in abstracted serious game narratives: themes such as patient empowerment (Yin, Ring, & Bickmore, 2012), psychological outcomes (Szczesna, Tomaszek, & Wieteska, 2012), or treatment adherence (Kato, Cole, Bradlyn, & Pollock, 2008). In the latter case, the serious game Re-Mission adopted a highly abstracted narrative, with the patient assuming the role of a "nanobot" fighting cancerous cells within the human body, in an action-shooter game. The goal was to transfer an understanding of how cancer develops, and the benefit of adherence to treatments such as chemotherapy, despite their negative side-effects. A randomised control trial demonstrated this approach to yield increased treatment adherence in the sample exposed to the serious game.

Whilst the themes of cultural awareness and cohesion are removed from these medical examples, some underlying themes remain valid: we seek to engage the player, and by doing so impact their behaviour. It is in this role serious games have been most frequently and successfully applied (Connolly, Boyle, MacArthur, Hainey, & Boyle, 2012); whilst transferring factual knowledge has also seen attention, the challenge in embedding simple facts in a game-based format without compromising entertainment, coupled with the fact that, assuming motivation, the learner may acquire this knowledge more rapidly through formal means of instruction, can limit its appeal. We consider then that the overall narrative for the MASELTOV game should provide a backdrop against which to address specific learning objectives under the themes of travel, healthcare, shopping, and jobseeking, but also seek to provide a more general overarching story which presents the player with a viewpoint on the need for cultural integration and the challenges immigrants face.

4.2 DEVELOPED NARRATIVE

The first decision in the narrative, reinforced by Y1 review input in MASELTOV, is not to stereotype the player's character as an "immigrant" - a term which has negative connotations in certain contexts, and, furthermore, can represent perceptions with little bearing on reality. Rather, the theme of migration is considered in terms of broader meaning: virtually all people

are migrants in very broad terms at one point in their life, whether joining a new social circle or moving small distances. Whilst MASELTOV focuses on the specific case of international migration, many themes remain the same, and learning outcomes are transferable.

We therefore cast the player as a leading scientist, working on an experiment to travel between dimensions. This neatly allows for a basis to develop distinct cultures in different dimensions, whilst also abstracting the narrative from a real-world context. Adopting the common "experiment gone wrong" narrative, the opening sequence of the game shows a lab experiment to "split" reality into two dimensions. Each is visually similar, though small differentiators exist to cue the player as to which dimension they are currently in. Inspired by Ghandi's quote that "no culture can survive which seeks to be exclusive", the opening narrative explains that, following the disaster, each culture is struggling. The player, therefore, must seek to rebuild the remnants of the experiment and reconcile the two cultures within the game.

The player is empowered from the opening scene of the game with the ability to transition between the two dimensions. Individuals exist in both dimensions, though their respective cultures differ significantly, and therefore the player is required to demonstrate an understanding of each culture in their dealings with these characters. Through the first conversation in the opening scene of the game, the player is cued to notice a difference between dimensions. This may be the first instance where the player realises the cultural difference between dimensions, and these differences are made clear through dialogue with NPCs. A journal system also updates with the observations of the player's character, reinforcing the targeted learning outcomes.

Throughout the journey, our hero must learn basic practical skills such how to obtain tickets to travel, drawing in both topics of travel and shopping, and is directed to find coins scattered around the environment to pay for things, introducing the currency system. Some information can be found by talking to passers-by or information desk employees. In other instances, such as the scientist needing train tickets, separate machines should be used, which will load up a minigame to play, resulting in the scientist receiving their ticket. Discussions with NGOs within MASELTOV have led to the viewpoint that practical skills such as purchasing a ticket are not key problem areas for immigrants; therefore these are not the focus of the game, however, they allow a break in the narrative from dialogue-driven content, preventing the player being overloaded with sequential conversations.

The scientist must find out where to stay, a local hotel, to set up base in this new city whilst trying to fix things. Throughout their search for a base, the player will come across NPCs who will provide them with the necessary information, if they interact in accordance with the set of cultural rules for each dimension. The task of finding somewhere to stay also draws in the topic of shopping and socialisation for the player.

The scientist requires four items to rebuild his dimension-splitting device. A central hub in the game includes characters who can provide these items, however, they need to be paid or helped. This means the player needs to find work to earn income. Within the central hub, the player eventually discovers a "job centre", and goes about the process of finding work. Recalling the ability to change dimensions, the player can observe how this process differs depending on the dimension they are in: four distinct job positions are available, each created twice to represent the different cultures. The player can succeed or fail in these interviews, allowing for some non-linearity in the storyline: if they fail, they can attempt the interview in

the other dimension and experience the cultural differences, or apply for a different job and attempt to apply what they have learnt about the culture in the current dimension to improve their chances of success. The player must figure out how best to behave and present skills during interviews in each dimension, in order to be successful, thus completing each level to obtain all available machine pieces.

With a job secured, the player must then travel to a location to carry it out. This is a more "gamified" component of the experience, intended to provide a break from dialogues and pacing. Each of the four jobs has a unique playable platform-style level, with the player needing to either deliver goods around the level, repair broken devices, find lost items, or puzzle-solve. In some cases, the player requires equipment purchasable from stores to complete, or more easily complete, the level. This feeds into the shopping and currency system within the game. In completing all levels successfully, our hero can gather the pieces, fix the machine and restore normality. This is a potential end-point for the game, though the narrative is extensible. After two of the four jobs have been completed (in whatever sequence), the player develops a sickness as a result of the dimension-hopping and needs to seek healthcare. A healthcare area in the hub allows them to experience how access to healthcare can vary between cultures.

With this overall narrative in mind, there is a need for a large number of dialogues to be developed and given to characters within the game. The next section outlines the methodology used to develop these dialogues.

5 DEVELOPMENT METHODOLOGY

Given that the narrative designed in Section 4 is predominantly dialogue driven, and that these dialogues are a core mechanism for conveying cultural learning, their authoring is a key component of a persuasive and engaging learning experience. A multiple-choice approach is adopted, allowing interactivity from the player and emulating the approach of many entertainment games. The multiple-choice approach allows for a degree of non-linearity within the game: choices made by the player impact their success in the interaction, and can have a range of consequences, such as failing to get a job on the first attempt, having to search rather than be given directions, or missing out on bonus items and currency. Section 5.1 illustrates the methodological approach taken to dialogue authoring, which seeks to draw on the experience of partners in the MASELTOV consortium (principally OU, within the Incidental Learning Framework, and NGOs). The following Section, 5.2, notes the need for multi-language support within the project, and discusses its implications. Section 5.3 describes the technical implementation of the dialogue engine in view of the considerations in Sections 5.1 and 5.2, primarily focusing on the need to provide an accessible means to edit, iterate, and update dialogues rapidly and efficiently.

5.1 DIALOGUE AUTHORING PROCESS

The dialogue authoring process used for the scenarios in the game involved the use of dialogue trees (Bateman 2007) – scripts for developing non-linear dialogue that allow user inputs and character responses. Since the MASELTOV game is a dialogue intensive game that encompasses conversations between the player and Non-Player Characters (NPCs), we intended to convey a story through the use of dialogue for different scenarios of use. The initial process, therefore, was to create a scenario storyline for each game scenario (i.e. travel,

job seeking, healthcare and shopping) as presented in Section 4 and then mapping the narrative for each scenario and Hofstede's Cultural Dimensions (D7.4.1) to game design (e.g. NPCs, art assets, in game dialogue boxes) - see Figure 1.

Figure 1: The conceptual process of dialogue design for each scenario

The overarching assumption is to create a conversational process where the player understands variations in culture through making relevant choices that impact how the story evolves. The game presents dialog options to the user in a dialogue interface resembling the process of a controlled interface (Karlgren et al., 1995). Authoring dialogues for a serious game is considerably more complex than creating dialogues for entertainment games. The process of conversation focuses not only in terms of designing dialogue trees that further evolve the story and allow the player to progress but also they must highlight the learning features including the learning activity, goals and feedback. In the context of the MASELTOV game we perceived that the intended learning goal is for the player to gain an awareness of different cultural features that would be instantiated through nested dialogue trees (see Section 6). Rather than a simple linear progression of topics, the MASELTOV game seeks to convey a set of cultural values, beliefs and practices. Even if the player has only one path in the selection menu that brings to the fore a certain cultural value the game still creates the illusion of influencing story progression, hence the dialogues are described in a more complex format than a video game script.

The first stage of Figure 1 takes the narrative highlighted in Section 4, and identifies the non-player characters (NPCs) required. For example, for the job interview scenario, a clerk at the job centre and four employers are the baseline requirement. For each of these NPCs, two distinct dialogues must be developed representing the two cultural dimensions within the game. To achieve this, the next step in Figure 1 is applied, mapping the cultural dimensions to the storyline by considering which of Hofstede's dimensions are more relevant to the situation, and how they might manifest themselves. With this determined, Step 3 in Figure 1 considers how the differences in these cultural dimensions might be translated into how a dialogue develops: for example an NPC might be less comfortable in an uncertain situation in one dimension, and difficult to communicate with, whilst the identical NPC in the other dimension is more open to uncertainty. The dialogue is then integrated within the game design in the final step, creating a technical specification for the appearance of the character, what other interactive items or backdrops might be required, or additional game mechanics (for example, in the case of the job interview scenario, the player's responses need to be tracked and evaluated).

This is viewed as the first step in an iterative cycle. The need to provide engaging dialogues suggests the use of humour and storytelling; however, the pedagogical need to transfer learning outcomes, alongside the need to consider the audience, complicates the process. Humour may not translate easily to other languages and cultures, and hence the next section describes how translation and localisation may take this into account. Furthermore, as with many serious game projects, the fundamental challenge is the need to balance education and entertainment within the dialogues (Zyda, 2005). Iteration requires the need for feedback into the design at each iteration; in MASELTOV we have sought to gain input from relevant

experts as well as from field trials. Complexity of language is one of the more interesting aspects here, since the game will be translated it is reasonable to assume immigrants will be playing in their native tongue, though again the need to consider elements such as humour means a challenging balancing act is required.

5.2 TRANSLATION AND LOCALISATION

The game is being developed in English in the first instance. Y3 will introduce translations into Turkish, Spanish, and Arabic[1]. A simple approach would be to use an automated translation service such as Google Translate; however, the errors introduced would likely be unacceptable if the goal is to provide an engaging narrative. Hence, there is a need within the finite resources of the project to source translators. Furthermore, the goal will be to repurpose rather than purely translate the game to different cultures: use of humour, plays on words, and story may all need adaptation to better suit a target culture. This will be considered in the translation process. Principal in enabling this is the need to provide a means to author and edit the hierarchic, multiple choice dialogues within the game. Hence, considerable time was spent on the technical implementation described in the following section to enable this.

5.3 IMPLEMENTATION

The dialogue engine for the game was created specifically for the needs of the project, and interfaced with the Unity game engine. It parses an XML input file assigned to an NPC at the development stage, which is incorporated into the APK at compile time, but can be freely edited prior to compilation. An effort was made to simplify the structure of the XML as much as possible to make it human-readable and editable with a simple tool such as Notepad, allowing for rapid development and iteration in Y3. In addition to tags defining the structure of the dialogue, a set of key words allow for more advanced features, such as conditional logic (e.g. IF the player has at least 10 coins, THEN make a payment response available). Each script includes a language tag allowing for localisation. The first line included in the dialogue XML is the text that appears when the player character moves close to the NPC, allowing them to initiate the dialogue:

```
<Dialogs>
      <NPC>
            <en>
                  <InteractionQuestion>
                  <first>Tap to speak to the passer-by</first>
                   </InteractionQuestion>
...
```

Each dialogue has content specified by the <main> tag. This is the line spoken by the NPC to the player prior to their response.

```
<Dialog>
            <main>Oh! You startled me. I'm sorry but I can't talk to an
outsider.</main>
```

Responses are then nested using <choice> tags. As screen space is limited on mobile devices, each dialogue branch allows for 1-4 responses from the player.

[1] In the Arabic case, there appears the widest variance in possible cultures and dialects; supporting all will be challenging, therefore, Turkish and Spanish versions will be prioritised.

```
<choice0>Sorry! Can you help me find the station?</choice0>
<choice1>Sorry to bother you - I'll be on my way.</choice1>
```

Each choice can in turn have a nested <main> tag for an NPC response, allowing for a hierarchical structure to be formed:

```
<choice0>Sorry! Can you help me find the station?
      <main>I'm sorry, I don't know where it is!</main>
            <choice0>Sorry to bother you - I'll be on my way.</choice0>
</choice0>
```

When viewed in game, the dialogues can be interacted with as shown in Figure 2. The user interface allows for the player to review the previous conversation, introducing a scroll-bar when the conversation history exceeds the available screen size. The player's journal similarly uses editable XML, the key difference being that journal updates are triggered as the player moves through the game world, rather than as conversations:

```
<?xml version="1.0"?>

<Entries>

<en>

<Entry01>Chapter 1 - A New Arrival Well, here I am. After the experiment
went wrong I'm going to need to rebuild my device. I'll need somewhere to
work so accommodation is my first priority. So: - I need to find somewhere
to stay. Perhaps the information desk or passers-by could help. - I need to
start learning about the cultures in the different dimensions. If I can get
them on my side, I'll be able to get them to help me gathering the parts I
need.</Entry01>

<Entry02>- I'll need coins to pay for things. I should search both
dimensions for them!</Entry02>

<Entry03>- Seems some objects are only in one dimension too. I should
remember to check both dimensions if I need to solve a problem.</Entry03>

<Entry04>- Hmm, I need a keycode. Perhaps the passer-by can help.</Entry04>


...
```

The main constraint imposed by the use a mobile device is the need to make text legible with a sufficiently large font size, whilst ensuring it fits on-screen. Several UI layouts such as that shown in Figure 2 have been tested both internally and in field-trials co-ordinated by CURE. One key addition from this testing has been the preservation of a chat "history", allowing the player to go back through conversations to re-read them. This is intended to support individuals with limited language skills, and allow people to review dialogues to identify cultural aspects. This is reinforced by journal updates which note the key learning outcomes in an immersive form.

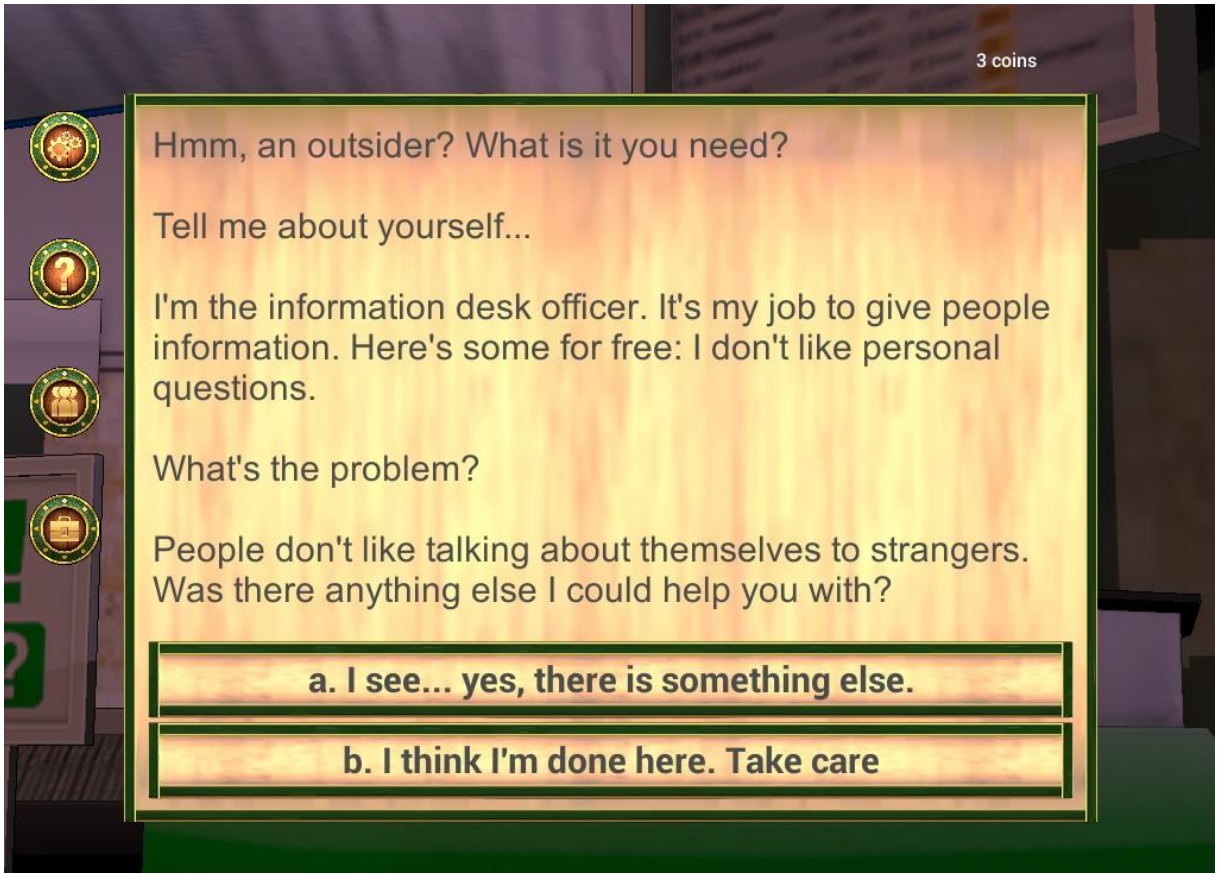

Figure 2: Example of a dialogue in-game during the iterative development of the UI

In order to be able to achieve this linear progression of topics in a way that supports the appropriate inclusion of the different cultural features in a form of a dialogue tree, we used the ChatMapper[2] tool for supporting the authoring process in terms of designing, editing and organising the dialogues before loading them into the game. In conjunction to ChatMapper we used Sublime Text[3] for creating an XML file for each scenario and its two overarching dimensions (individualistic vs. collectivist) that contain all the necessary dialog trees firstly described with ChatMapper and then transformed to XML via Sublime Text for loading them at runtime. ChatMapper's use is not mandatory, and dialogues can be edited using a simple text editor, but the use of a visual interface expedites the process.

Iteration of the user interface shown in Figure 2 sought to improve on the legibility of text on a mobile device, as well as improve the use of available screen space. This led to the development of the interface shown in Figure 3, which in addition to using more available screen space, adds a small portrait of the character being interacted with, and expands the touchable area for buttons representing response options. The chat history system is preserved, with a scrollbar again appearing as the dialogue history expands beyond the available screen size. Furthermore, the journal system remains active, allowing the user to review the journal and reflect on their choices before providing a response.

[2] http://www.chatmapper.com
[3] http://www.sublimetext.com/

Figure 3: Current dialogue UI in-game. The UI was changed to use more available screen space, as well as to provide higher contrast between text and background

ChatMapper aided us in generating a set of conversations that represent interactions between the player and each NPC. The entire process of dialogue design and implementation is depicted in Figure 3 and 4. We understand this as a cyclical process that occurs for each scenario and starts from creating the scenario narrative and finishes after loading the generated XML file into the game. We designed a conversation as having one start and multiple ends for both dimensions in the game. A dialogue is initiated when the player approaches an NPC. The end is indicated when the player is returned back to the game scene which indicates that a scene has ended. The elements of a MASELTOV Game conversation are the following:

Cultural dimension: The overarching cultural dimensions in the game are two: Individualism vs. Collectivism which encompass further dimensions of cultures within these key cultural dimensions such as inequality, need for security, relationship with others and emotional gender roles.

Dialogue structure: The dialogues structure is based on the notion of a non-lienear dialogue tree where the player can select different dialogues, which lead to different progressions or small changes into the game's storyline. For example certain dialogues would lead to unlocking next dialogues or in terms of getting a ticket used for travelling by train to get at the city centre. The structure has been created using ChatMapper as means to conceptualise and visualise the connections between dialogues as well as for associating the cultural dimensions to individual dialogues as well as to the whole dialogue set (see Figure 4).

Player character: The game assumes a player interacts with non-player characters that appear in certain stages within each different scenario. Decisions about what player line is to be

selected by the player character are made by the player via the dialogue interface on the screen.

Non-player Character: NPCs are the characters a player is interacting with. NPCs have attributes similar to those of the player with the only difference that their responses are controlled by the system and are based on the dialogue selection of the player.

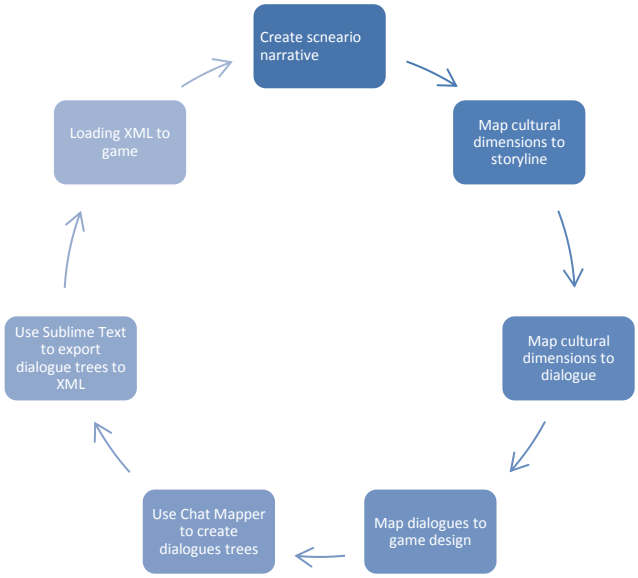

Figure 4: The cyclic process of dialogue design and implementation developed for the MASELTOV game.

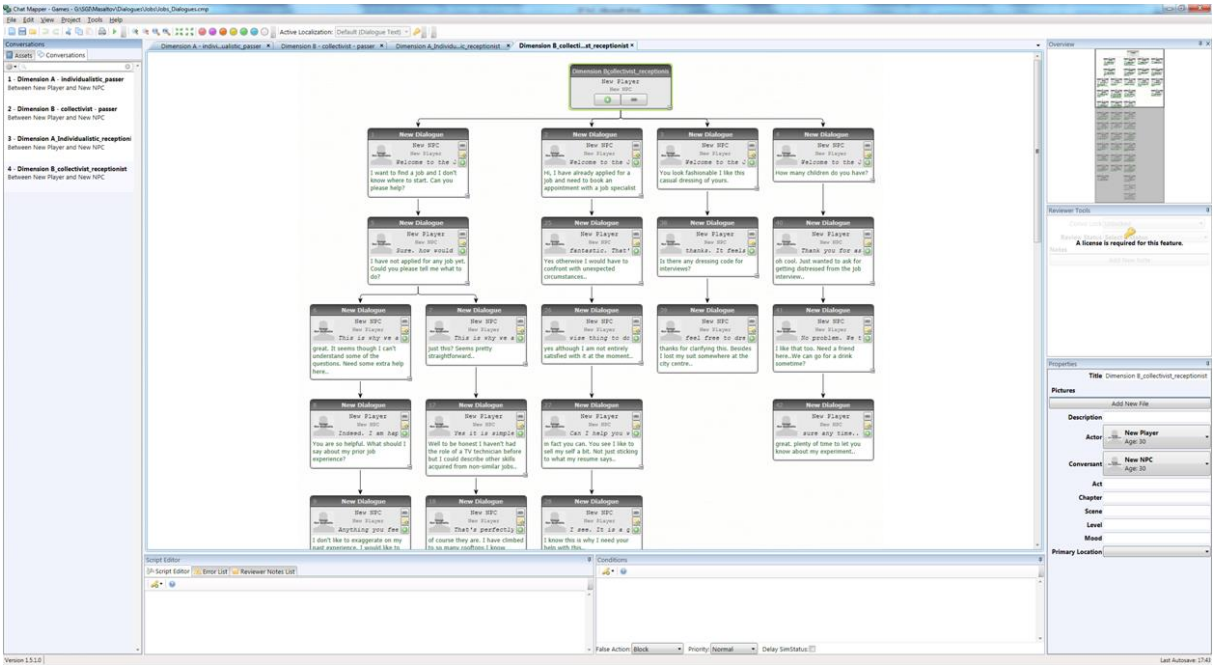

Figure 5: MASELTOV game dialogue structure visualised in ChatMapper

5.4 INVENTORY SYSTEM

Whilst D7.4.1 notes the implementation of the inventory system, we expand here on its purpose with respect to persuasive learning. Noting the need to implement reward and feedback mechanisms within the game, the inventory serves not only to give the player a means by which to manage the items they have collected, but also to view them and read accompanying descriptions. To increase their perceived value, items have functional as well as aesthetic attributes: the top hat shown in Figure 4, for example, allows the player to run faster, as well as appearing on the avatar as a cosmetic change. Again, the goal here is to give items as much perceived value to the player, as this in turn is hoped to increase the perceived value of currency. As currency rewards are used as a motivator for using other MASELTOV services, time has been invested in developing the inventory and reward system as well as the "shopping" scenarios to allow these items to be purchased and equipped.

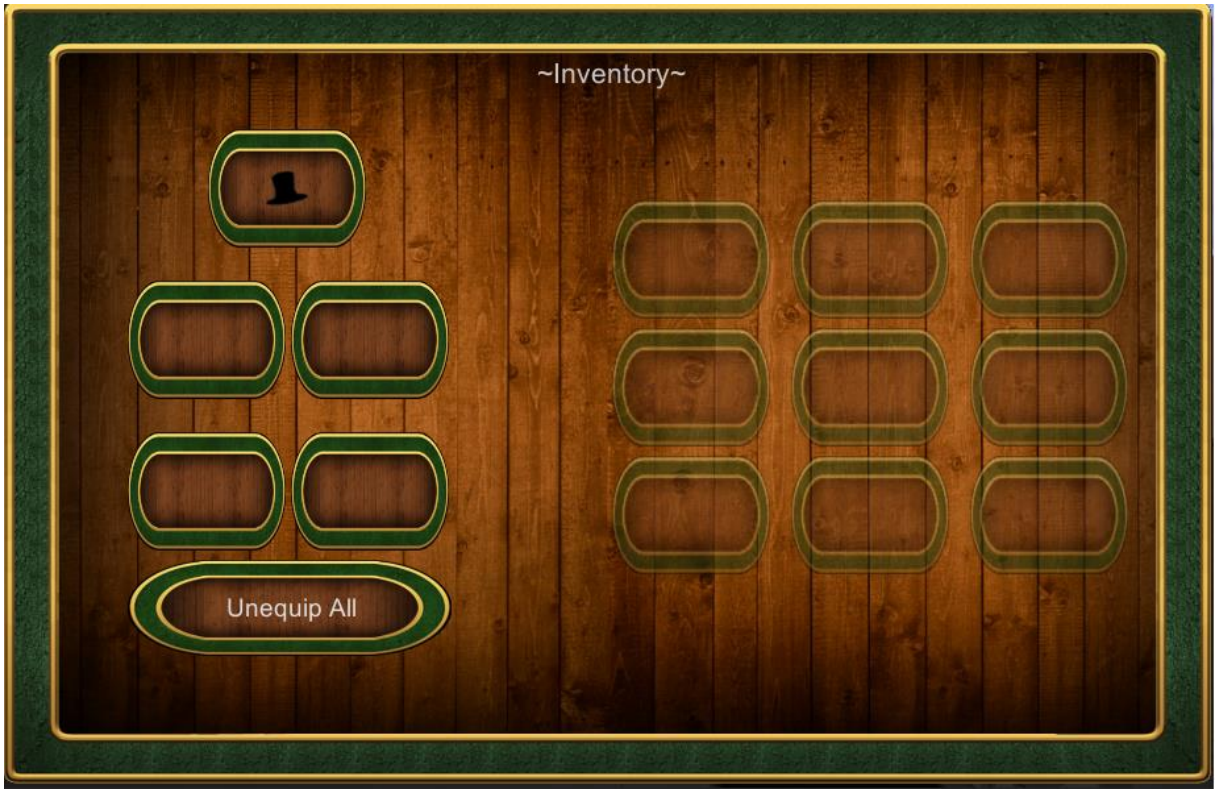

Figure 6: Basic inventory system. The player can equip items from their stored items list (right) into various slots for their character.

Again a touch interface on a small-screen presents a challenge; the UI devised in Figure 4 has been developed and tested with this in mind. Item profiles are stored in a separate XML file, allowing items to be rapidly designed and added to the game.

Figure 7: As well as equipping items, players can read descriptions of the item and the benefits they give their character. As items are purchased with in-game currency, the intent is to give these items perceived value.

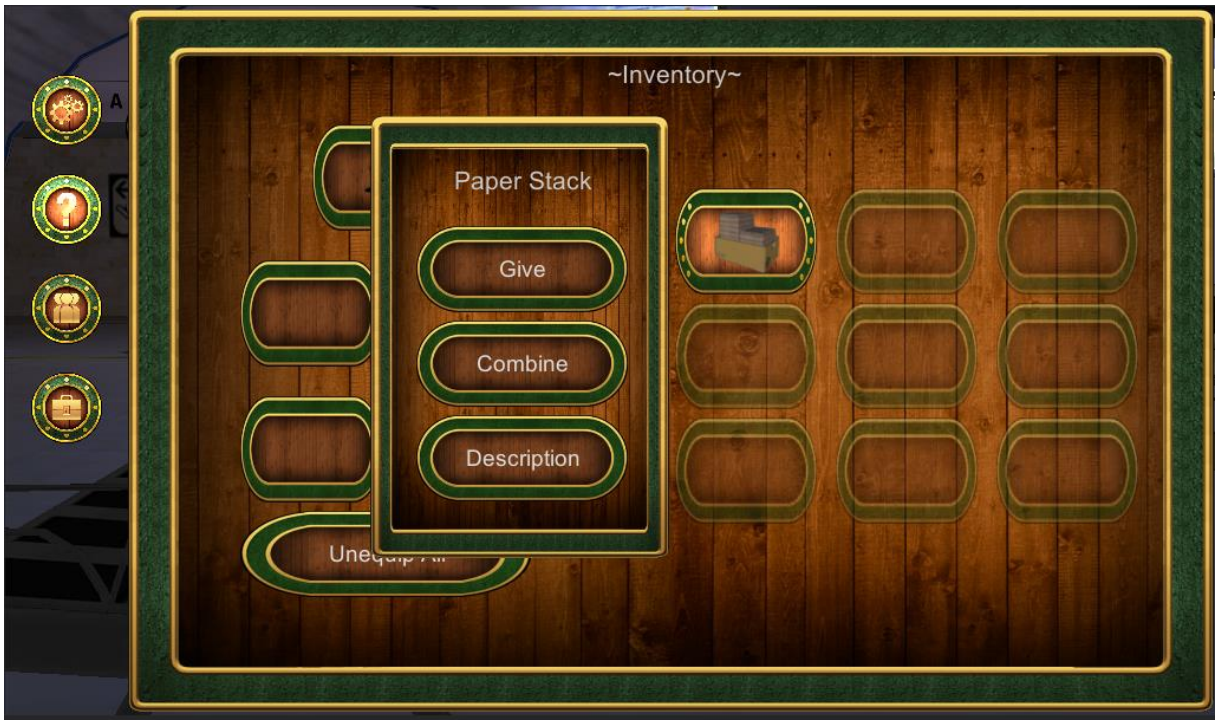

Figure 8: Quest items are also supported. Here we show a "stack of papers" used in the jobseeking scenario. Items can be given to NPCs, combined with other items, and again have an accompanying description.

5.5 JOURNAL SYSTEM

As noted previously in Section 4, the journal provides the critical function of scaffolding and reinforcing learning outcomes, by means of the player's character recording their thoughts and observations for the player to view. The journal can be accessed at any time, though the game also prompts access at certain points by flashing the journal icon on the left of the display - this happen automatically when an update is added, but can also be triggered by context, for example if the player is facing a puzzle with which the journal can assist. The journal is split into three tabs, navigable by touch: the "objectives" tab provides a current list of tasks for the player to accomplish, and seeks to ensure they never feel "lost" or without a purpose in the game. An "outcomes" tab is pedagogically-focussed, and seeks to highlight the key learning outcomes. Following the integration path specified in D7.4.1 Section 5, a goal in Y3 is linking these learning outcomes to context provided by relevant partners with more formal learning resources, allowing the player to tap links in the outcomes section and transition to this learning content.

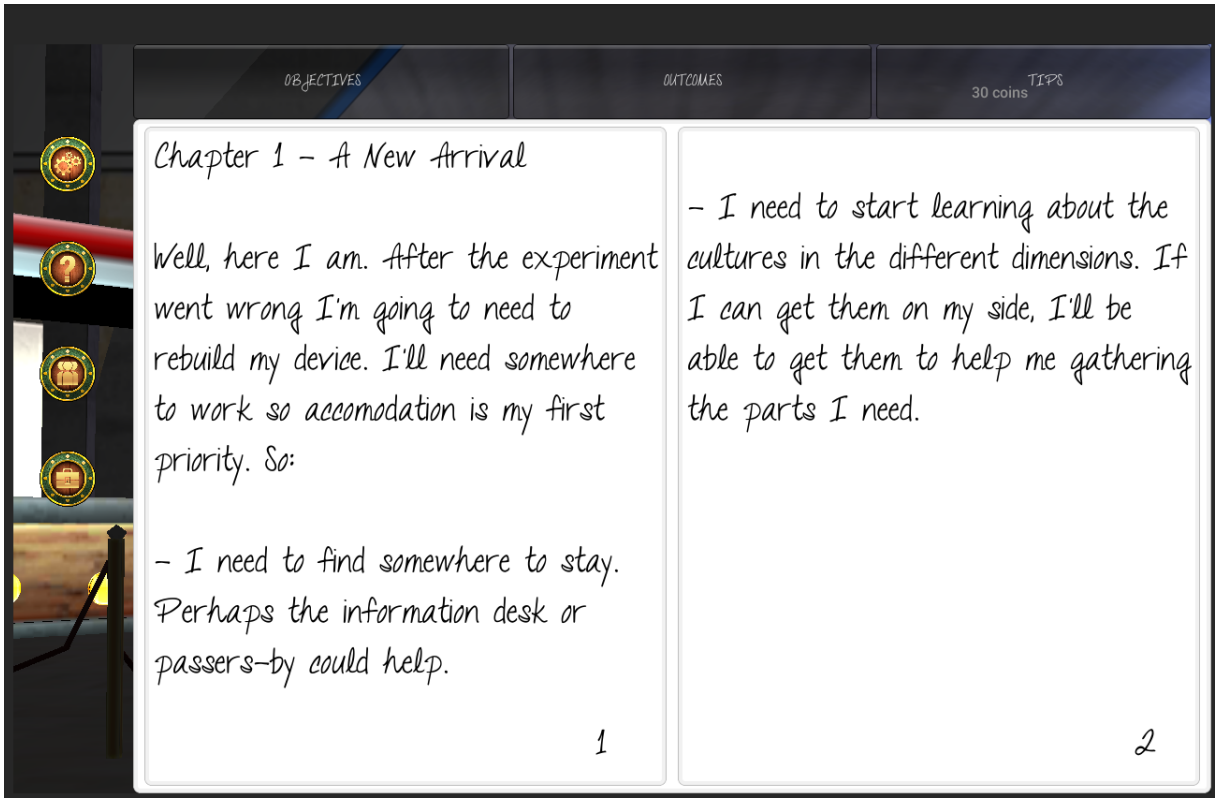

Figure 9: The journal in the current version of the game. The background is still being developed to emulate a paper journal. Note the three tabs at the top: one details the players current objectives, the second relevant learning outcomes, and the final tab functions as the "help" system for the game.

One challenge identified in early testing was how to convey the basic functionalities of the game to users without experience playing platform or adventure style games on a mobile device. Initially, a tutorial was used which introduced lateral movement, jumping, dimension flipping, dialogue interaction, and equipping items. However, testing within the consortium and with NGOs identified this as a potential barrier to entry, with the tutorial by nature needing to introduce many different mechanics quickly, and making it possible for players to become stuck and unable to progress.

To address this problem, the help system was transposed to the journal rather than an interactive tutorial. As the journal can be prompted to appear automatically in certain contexts, it can be used to provide context sensitive help: for example, the first time the player needs to jump to overcome an obstacle, the relevant page can be shown explaining how to do so. The written system also allows for additional depth to be added to the help pages, and has pedagogical potential in providing lists of relevant learning resources and links to other MASELTOV services.

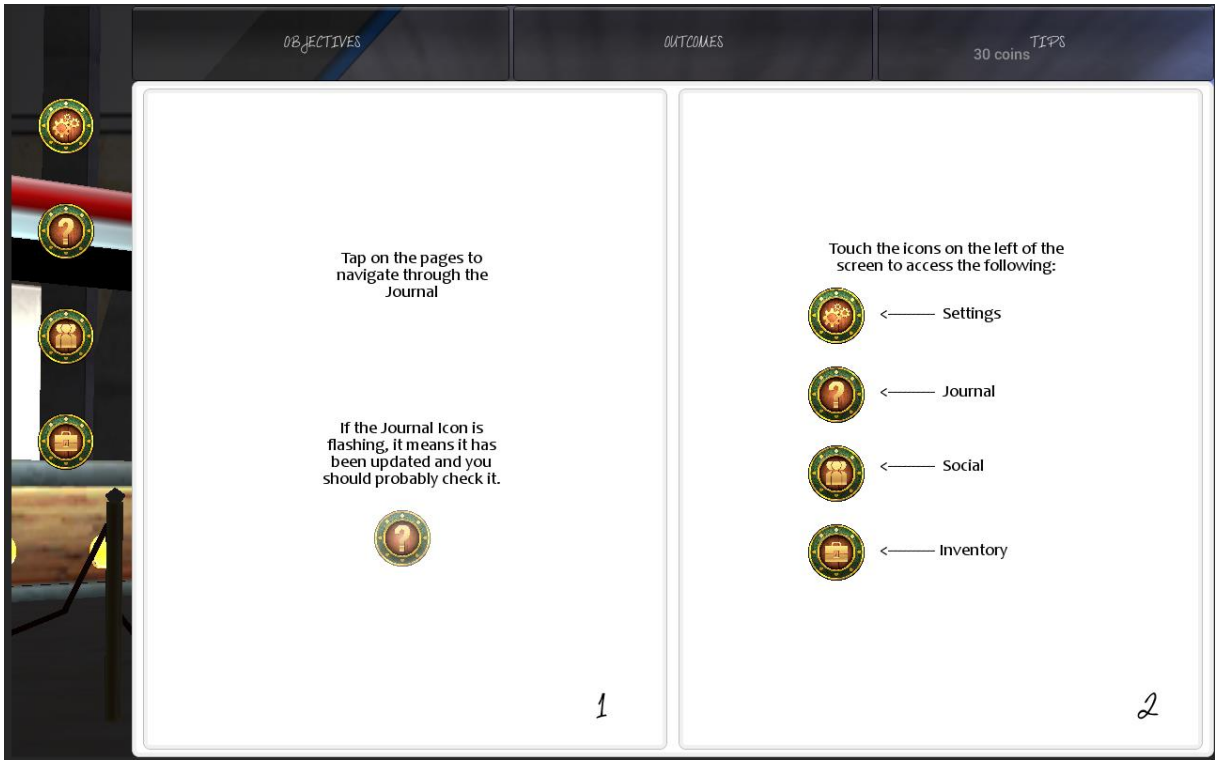

Figure 10: In-game help, embedded in journal pages. Initially, a tutorial was used when the player started the game; this was removed as it proved a barrier to entry, and also increased the timespan from the player starting the game and getting into the learning content.

Combined, the objectives and outcomes sections seek to contribute to the persuasive learning experience through text updates that clearly show the player what they need to achieve, and what they have already accomplished. In the event a player fails to observe a cultural difference through dialogic interaction with an NPC and their counterpart in another dimension, the journal scaffolds and reinforces the learning process by having the player's character note the differences and suggest how understanding these differences may lead to a more positive outcome. Coupling the help system for the practical aspects of the game such as navigation consolidates the more formal aspects of learning content within the game to the journal. With the straightforward XML implementation noted previously in Section 5, a platform has been created allowing for journal entries to be authored and integrated into the game swiftly. This will be used as the basis for iterative and collaborative development across the MASELTOV consortium, towards the field trials in Y3.

6 CHARACTERS AND DIALOGUES

The first and most essential character to develop is that controlled by the player. Returning to the theme of empowerment, we have implemented a gender-neutral avatar, with a range of animations required for plausible movement through the game and platform levels. These animations include idle, walk left, right, backwards, talk, run left, right, backwards, jump, pick up, and button press. Animations are blended depending on the context of the character and user input.

Figure 11: The player character in various animation states and contexts

The player character provides an interesting dual-role, as both the avatar of the player, and a learner partner. They can independently provide their observations to the player through the journal, meaning that whilst the player controls the character, they are also able to act as a more-able partner (Vygotsky, 1970). In line with Vygotsky's theory, we assume the learner has their own zone of proximal development, and requires external support and feedback to progress beyond this. Hence, by using the character as a more able partner, we are able to have them reflect on situations and note observations which the learner may have missed. This allows a more direct route to recording learning outcomes, which are incorporated in the journal as their own section as illustrated in Section 5.5.

It is also interesting to note previous research which has shown player whose avatar corresponds to a certain role or character, will tend to adopt the behaviour anticipated of that character, rather than their own (Carter, Gibbs, & Arnold, 2012; Fox, Bailenson, & Tricase, 2013). This "Proteus" effect has interesting learning potential, as it offers the potential to encourage learners to explore and behave in ways which might be outside of their normal comfort zone, or, linking this to Vygotsky's theory, their zone of proximal development. The game purposefully places the player in a situation where both cultures are alien to them, yet they are also empowered with a different perspective to other NPCs in the game, as well as an overarching task expressed through the narrative. A goal here is to encourage a playful, exploratory approach to learning in situations which, in a real world context, may inhibit this form of approach from the learner.

The following tables summarise the developed roles for non-player characters in the game, and how their dialogues might be expected to differ between the two cultural dimensions within the game.

6.1 NPC01 INFORMATION DESK OFFICER (AIRPORT)		
Overview	This is the first NPC the player has the opportunity to talk to. Their primary role is to provide introductory background on their respective culture. This is conveyed either formally, with the player asking direct questions on how certain things are accomplished (in the case of the scenario, travelling and finding accommodation), or indirectly, with the character either keen to avoid uncertainty in their information or open to it; being more or less formal; and framing their responses to the player in a high vs low context form (i.e. focusing less on what is said than how it is said in one culture, and vice versa).	
	Dimension One (D1)	Dimension Two (D2)
Dialogue Traits	The character in D1 is more sensitive to being asked personal questions, and shows resistance if the player attempts this. More formal questioning reveals some first insights into D1's culture: it is individualistic, masculine, and with high uncertainty avoidance. The player can receive practical information, which follows these paradigms, for example, directing the player to the hotel in a route with the least uncertainty. Furthermore, this culture exhibits a high power-distance, meaning an understanding of the various strata of society is assumed by the NPC - but unknown by the player. This presents a challenge in this dialogue, and can result in a negative outcome, with a note added to the journal.	In contrast to D1, D2's culture is collectivist, feminine, and with a lower uncertainty avoidance. In this particular dialogue, this manifests itself through an NPC who is more open to giving informal information to the player, but is also less prone to recommending a "best option" or clear process, due to the lower uncertainty avoidance. Society is not as stratified in D2, an outcome learnt be the player in this first dialogue, and this can present more of a challenge when the player is required to be more sensitive to informal cues and the need to appear more friendly and social by using relevant language.
Dialogue Outcomes	Journal update follows the dialogue with notes the the D1 culture.	Journal update follows the dialogue with notes the the D2 culture.
Notes	This is a repeatable dialogue - the player can return to the NPC and ask for further background as needed. It is also optional, and the player can walk past the information desk without requesting help, however, the journal will update recommending they ask for information.	

6.2 NPC02 PASSER-BY (AIRPORT - STATION LINK)		
Overview	In addition to the information desk officer, the player can also adopt the less formal approach of asking a passer-by for help. Differences in casual conversation are intended to emerge depending on the dimension the player is currently in, allowing some insight into how first social contacts may differ between cultures. The context for this dialogue is a simple progression puzzle, with the player needing to find the key code for a gate. This serves the purpose of making interaction with the NPC mandatory, whilst the simplicity of the puzzle reflects the fact the player has just arrived in the game, and may still be familiarizing themselves with the two dimension mechanic.	
	Dimension One	Dimension Two
Dialogue Traits	We exemplify the more stratified society in D1 by making the character far less open to being approached by a stranger. This makes progressing past the first few stages of the dialogue more challenging, encouraging the player to return to NPC01 for additional cultural information. Effectively, succeeding in this dimension requires and understanding of formal process and societal hierarchy.	In the collectivist setting, members the player is rewarded for understanding and allegiance to group norms. By demonstrating this understanding, they can gain the assistance of the NPC. This takes a more social discussion format with the NPC, with the player having opportunities to show their understanding and subscription to the societal norm.
Dialogue Outcomes	The first half of the key code to the gate.	The second half of the key code to the gate.
Notes	Providing the key code in two halves mandates that the player will have to traverse the two dimensions to solve the problem. To ensure this isn't a sticking point, with the player unsure of how to progress, a journal update coupled with highlighting of the dimension flip button at the relevant time reinforces the process of changing dimensions.	

6.3 NPC03 TICKET CLERK (STATION)		
Overview	This character outlines the process of travel in their respective culture. Drawing on Hofstede's framework, concepts such as power-distance differences between cultures can be expressed through classes of travel and freedom of movement for citizens. This leads to the second puzzle in the game - the player must obtain a train ticket to travel to the centre of the game's city (the Hub area).	
	Dimension One	Dimension Two
Dialogue Traits	Building on the stratified, high power-distance culture in D1, a wide range of classes of travel exist in this dimension. Freedom of movement is also less straightforward, with the player expected to provide relevant documentation to the NPC. As the player does not possess this documentation, they must utilise the dimension flip ability to transition to D2. The NPC also has an informational element similar to NPC01, allowing the player to ask more general questions about the culture and locations in the game, and receive information which is preserved in their journal as notes.	In D2, the greater degree of uncertainty presents the player with a problem, as whilst the ticket clerk is available, he cannot issue tickets due to a fault, and therefore the player is required to use a ticket machine, which presents a mini-game based on the challenges of purchasing travel tickets in a foreign language. As with D1, this character also supplies background information on the game world and culture within D2, noted by the player in their journal.
Dialogue Outcomes	After exhausting all options, the player's journal updates suggesting they try to purchase a ticket in D2.	The player is directed to the ticket machine within the station and initiates the mini-game to obtain a ticket.
Notes	Discussion with the NPC in either dimension is non-mandatory, however, the intent is to make the ticket machine puzzle sufficiently non-straightforward that asking the character for advice is a logical step for the player. The journal system is used to reinforce this, by updating with the recommendation to speak to the NPC after a failed attempt to use the ticket machine.	

6.4 NPC04 PASSER-BY (HUB)		
Overview	This additional character can be approached in the central hub area of the game, differing between dimensions in their openness in conversation and reflecting again Hofstede's dimensions: masculinist vs feminist, low vs high uncertainty avoidance, and low vs high power distance. In both dimensions, the NPCs are protesting a societal issue unique to their dimension. This allows for an interesting "counterpoint" character to be implemented in each dimension who is critical of their own culture.	
	Dimension One	Dimension Two
Dialogue Traits	As with the NPC02 passer-by, the player is expected to take a more formal approach to initiating a conversation, and appreciate the various levels of the high power-distance society. Through discussion, it emerges this NPC is protesting against the society's rigidity and hierarchic structure. This allows the player an opportunity to discuss these issues with the NPC, and identify key problem areas in individualist, high-power distance cultures.	Whilst this character is similarly protesting against a societal issue, the nature of the issue and the context of the protest differs from D1. In this case, it is the uncertainty and need to conform to the social norm which is the key point of contention. Through discussion with this character, the player gains insight into the internal challenges faced by collectivist, high uncertainty cultures, and has the opportunity to reflect their understanding in the dialogues.
Dialogue Outcomes	This dialogue is currently being iterated, as several ideas - such as a currency reward for reflecting cultural understanding - may deliver an inappropriate learning outcome. Central to understanding this is researching how users perceive and react to game content. The target learning outcomes specified in D7.4.1 require reflection from the learner on the abstract nature of play, and how and why lessons learnt may translate to real-world situations. It may be the case with sufficient scaffolding and links to external resources, that the introspective nature of these dialogues with respect to their host cultures can provide a means to review how individuals in different cultures express issues.	
Notes	Discussion with neither NPC is mandatory to progress the plot of the game, but a journal update can suggest to interact with the character.	

6.5 NPC05 HOTEL RECEPTIONIST (HOTEL)		
Overview	One of the first tasks of the player is finding accommodation. Whilst cultural variance in hospitality is less predominant, the receptionist provides further background on their respective cultural dimension and progresses the game's narrative.	
	Dimension One	Dimension Two
Dialogue Traits	The character behaves formally and expresses surprise that someone dressed as the player character (as they have just arrived in-game, and not yet had time to acquire new items) might expect, and be able to afford, accommodation. The NPC also serves in an informational role, allowing the player to identify their next course of action - finding a job. Fitting in with the narrative of the game, this requires the player begin to ask about the critical items they need to reconstruct their experiment, and where they might be found. This NPC provides some information towards this end, but notes that for the player to acquire the items, they will require currency, and hence a job.	Whilst as with other NPCs, the collectivist, low-power distance culture is reflected through the NPCs idioms, There is comparatively little distinction between D1 and D2 in this case; this serves to contrast the differences between NPCs through the remainder of the game, and serves as a note that cultural differences do not ubiquitously impact interactions. That said, the informational aspects of this character draw on a less formal approach, suggesting that a job might be found in the player is able to network effectively and collaborate within the societal structure.
Dialogue Outcomes	The player receives a room key, provided they have found sufficient coins to afford the room.	
Notes	One discussion here was whether it was more appropriate to include a hotel or rental / temporary accommodation. Whilst the latter may feed-in better to a learning scenario on finding accommodation, the early-stage decision in the project was to focus on healthcare, travel, jobseeking and shopping scenarios. The hotel has the advantage in requiring less content be developed, allowing for resources to be focussed on these key areas. It also provides a social backdrop against which to introduce more social conversations through NPC06.	

6.6 NPC06 SOCIAL CHARACTER (HOTEL)		
Overview	NGOs raised that general social etiquette and ways to join social activities was relevant to integration. This characters seeks to allow some observation of cultural differences in a social context.	
	Dimension One	Dimension Two
Dialogue Traits	Adopting a high-context culture, in which information is predominantly in the physical context or situation, communication is expected to be more indirect and less informational. Monochronism - tendency to undertake a single task at a time - can also be conveyed, by placing this NPC as an employee off-work.	We contrast D1 with a low-context culture, in which information is principally conveyed through the communication. Rules and expectations are discussed, allowing for further insight into the social norms of the culture in D2. The theme of polychromism is also explored, with the character seeing time in a more holistic fashion.
Dialogue Outcomes	We initiate a puzzle here through small-talk - the wall safe in the player's hotel room has been locked by the previous occupant, and the hotel staff cannot reopen it. Successful discussion with both NPCs reveals parts of the puzzle required to unlock it.	
Notes	Whilst socialising with different cultures, and understanding how this might impact social interactions, is a key step towards integration, it is also one of the most difficult to model effectively. This is largely a result of the uniqueness of individuals, and the difficulty in saying how a social interaction functions for a given culture in a plausible, generalizable fashion. However, inclusion of this NPC allows for this to be explored to a limited degree, as well as the cultural distinction between cultures which tend to be mono- or polychromatic.	

6.7 NPC08 JOB CENTRE CLERK (JOB CENTRE)		
Overview	Discussions with NGOs provided some useful input into the jobseeking dialogues. Principally, misperceptions from migrants surround the value of networking vs formal application, and the difference between concise applications which identify transferrable skills, and ones which value more volume of experience. Through discussion with the clerk, the player can gain some insight into which approach is most appropriate, and use this knowledge for the job interviews.	
	Dimension One	Dimension Two
Dialogue Traits	We accentuate the need for a formal approach to the jobseeking process, with the player required to register and document their skill set then send the application to the interviewers (NPC09-12). The player can also received some advice about how to be successful in interviews; discussion with NGOs suggested the approach of distilling down a skill-set to relevant skills, rather than presenting all skills and certifications, as well as understanding the need to follow a clear procedure was a common misunderstanding. Hence, in D1, these skills are recommended and discussed with NPC08.	The networking aspects of finding employment are emphasised, with the clerk informally recommending the player to the interviewers, provided their responses demonstrate understanding on the collectivist culture. Paperwork created by the player takes more of a holistic approach to reporting their skills and competencies than in D1.
Dialogue Outcomes	The player creates a "stack of paperwork" which they need to take to the employer.	The player in informally referred to the employer, with a letter of recommendation.
Notes	This NPC serves as an informational aid, providing the player with guidance notes for their respective dimension. These are recorded as journal entries, which the player can refer to during interview with NP09-12.	

6.8 NPC09-12 JOB INTERVIEWERS

Overview	NGO discussion highlighted that understanding how job interviews may differ between cultures appeared a common challenge for immigrants, and has been given some emphasis within the game. In each interview, the questions posed are similar, but the player must demonstrate cultural understanding in their responses. Jobs reflect some real-world grounding, though the resulting tasks require a degree of "gamification" to fit the overall narrative arc, and the need for these jobs to result in engaging gameplay. The four "jobs" therefore, are: • Repair: the player must navigate a platform level to repair broken devices; • Delivery: the player must navigate a level to deliver packages; • Retrieval: the player must search a level for a collection of lost items; • Engineering: the player must navigate a level to place components to construct a device	
	Dimension One	Dimension Two
Dialogue Traits	In D1, we accentuate the more formal approach to the interview process, with paperwork being required to have been completed and forwarded by NPC08 prior to each interview. Each interview takes the form of 5-10 questions about competencies and experience, with an emphasis on the player being able to identify transferrable skills.	Success in part depends on the strength of the recommendation from the job centre clerk, which varies depending on the discussion of the player with NPC08 prior to speaking with the relevant interviewer.
Dialogue Outcomes	In either dimension, interviews can be passed or failed. The journal scaffolds this process with recommendations on next actions: for a successful interview, the player may either undertake the job immediately, or complete the interview in the 2nd dimension to double their reward. On fail, they may apply for any of the uncompleted jobs remaining in the game. If jobs for which failed interviews are the only ones which remain, the player may "re-apply" and undertake the interview again.	
Notes	After completing two of the four jobs successfully, the player develops an illness which prevents them from continuing work. At this point the interviewers will be unresponsive until the healthcare scenario is completed.	

6.9 NPC13 DOCTOR (HOSPITAL)		
Overview	Another theme from NGO discussions was the need to understand how access to healthcare can vary between cultures. An example would be the difference between systems where a general practitioner (GP) serves as a first point of contact in all non-emergency instances, versus systems where the patient seeks a relevant specialist. The need for registration, communication with doctors, and access to information were also raised.	
	Dimension One	Dimension Two
Dialogue Traits	The player speaks to the doctor for an initial assessment. Healthcare is freely available in this culture, though the player needs to register with the doctor prior to examination. The doctor then refers them to NPC14 following completion of the dialogue.	The doctor is surprised the player did not immediately seek out a specialist. He asks if cost is an issue, as a private healthcare system is implemented in this dimension.
Dialogue Outcomes	Referral notes, allowing the player to initiate a dialogue with NPC14.	This dialogue is informational and optional.
Notes	This character and environment is scheduled for implementation in M24-30 of MASELTOV.	

6.10 NPC14 SPECIALIST (HOSPITAL)		
Overview	To support the differences in healthcare noted above for NPC13, the way this character is approached and communicated with varies between dimensions.	
	Dimension One	Dimension Two
Dialogue Traits	If the player attempts to approach this NPC before following the formal process through NPC13, they are refused access.	The player may directly approach this NPC, however, healthcare in this dimension requires currency.
Dialogue Outcomes	On completing the dialogue successfully, the player is "cured". However, the journal updates with the fact they are only half-cured, as their illness persists in the other dimension, therefore they must also complete the healthcare scenario in D2.	
Notes	This character and environment is scheduled for implementation in M24-30 of MASELTOV.	

Implemented examples of the first set of dialogues (NPC01-3), currently in draft form for iteration in Y3, are included in the prototype APK that accompanies this deliverable. Characters and locales have also been implemented for NPC01-8, with the healthcare scenario left to implement in Y3.

7 SUMMARY AND CONCLUSIONS

In this deliverable, we have presented the case for using virtual characters and the player avatar to provide a basis for persuasive learning. This is achieved through a game narrative which seeks to engage and immerse the player, with the story conveying learning objectives in a persuasive form through the player's experience. The primary mechanism for transfer of learning is dialogic interactions between the player and NPCs, with branching non-linear dialogues allowing for an interactive experience. With the player's ability to jump between two cultures, they can observe characters in identical roles but with different cultural backgrounds, and observe the differences and challenges that emerge when dealing with different cultures.

The overall design of the game intentionally abstracts itself from reality, to avoid criticisms over expressing cultures in certain ways, or implying that a certain way to behave is "correct". This results in a challenging authoring process, which we have sought to support through a clear methodological approach in Section 5. Noting the requirement for an authoring process which supports rapid iteration and input from individuals with game design, educational design, and immigrant support backgrounds, as well as potential end-users themselves, a technological solution has been developed which allows for dialogues to be represented in a lightweight XML format. This also supports conditional logic, allowing for non-linear dialogues to be created which test variables to allow for progression. As an example, during job interviews, the player can be scored leading to both success and fail outcomes. Alongside dialogue authoring, the journal and its contents as detailed in Section 5.5 has also been implemented to utilise XML, allowing for rapid authoring and editing to accompany dialogues and scenarios. This deliverable has discussed how the player character may also serve as a more-able partner through their journal entries, allowing for learning outcomes to be recorded in a seamless and non-intrusive fashion during gameplay.

With the model for playful cultural learning implemented by this deliverable, Y3 will capitalize on their technology to iterate and further develop dialogues using the schema presented in Section 6, addressing the key scenarios of travel, healthcare, shopping, and jobseeking, towards the learning objectives specified in D7.4.1. Translation and localisation of the English dialogues is also a key task; again, the developed technology seeks to strongly support this, with support for non-Western character sets implemented in the fonts used within the game, and the user interface layout and journal adaptable to Arabic text. This will allow field trials to be used as a large-scale opportunity for feedback prior to exploitation, identifying remaining issues with dialogues and eliciting suggestions from participants, as well as examining how effectively content delivers against target learning outcomes. Section 5.5 also notes the capacity of the journal to link externally to other resources, and the implementation of formal language learning content by relevant partners will provide an ideal opportunity to use this "link-out" functionality for learners keen to develop their skills beyond the game.

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