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MeTycoon: A Game-Based Approach to Career Guidance

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Abstract—**Understanding the relationship between immediate decisions and long-term career prospects is a vital skill in a job market which is becoming increasingly globalised, competitive and dynamic. The application of digital technologies and multimedia to career-guidance offers the potential to go beyond the confines of the classroom and provide a depth of insight into career decisions and their consequences in interactive and engaging forms. This paper reports on an approach which uses a serious game as an approach to career guidance incorporating game-based elements such as character development and decision-making alongside a visual and user-centric approach to fostering engagement. Deployed online and targeted evaluation questionnaires at a UK audience, the developed 'MeTycoon' game provides both direct access to learners and other resources encouraging its use in blended contexts by teachers and career support professionals. Analysis of the game uptake and user engagement reveal encouraging levels of user engagement with the game's website generating 38,097 visits and 408,247 views of career videos embedded within the game. An online survey of players (n=91) with closed and semi-structured questions provides some insight into players' perspective, demonstrating MeTycoon's approach, in which pedagogic elements such as informational videos are closely integrated into the game's mechanics were perceived as an intuitive method for facilitating learning.**

Keywords— serious games, career guidance, multimedia applications, pedagogy.

I. INTRODUCTION

Sound career advice and guidance is key element for student's future career as students make the transition between full-time education and the workplace. Career services provided by many universities and training centres alike have traditionally aimed to promote effective transitions into working life whilst ensuring students realize their hole potential [1]. It is therefore essential that solutions are developed which support career services in the delivery of both generic and personalised guidance, whilst ensuring that the realities of rapidly evolving adult labour market and long-term career development are not overlooked. Focusing on the specific case of the European Union, existing initiatives seek to implement life-long learning strategies and policies towards the developing their citizens employability, building upon established policy directives [2]. Such approaches seek to empower citizens with the skills to manage their own education and employment; yet in order to support such approach, all citizens must have access to high quality information and advice about education, training and work. Internet-based resources can play an invaluable role in providing these services in the absence of an infrastructure that allows one-to-one guidance counselling, or enhance existing initiatives by providing alternative means to reach learners and encourage reflection. However, there is a discrepancy between what the public policy is aiming to achieve and the actual delivery of career guidance services [3] illustrating the need for innovative approaches which can demonstrably improve existing programmes.

Such approaches may seek to broaden existing guidance techniques to include various issues relevant to transitions into and journey throughout the career, or allow learners to explore the impact of potential changes to external and personal circumstances. Though traditional face-to-face career guidance has rapidly evolved into technology-based interventions such as online services [4], the engagement of learners and ease of use and understanding are vital.

This paper explores the use of a serious game to address these issues, which predominantly involve engaging learners whilst effectively establishing learning outcomes. In the following section, the state-of-the-art in serious games design is related to the issue of career guidance, leading to the description of the MeTycoon approach[1] in Section 3. An analysis of the game's uptake and usage are then discussed, along with the experience of players gained through closed and open questions in an online survey. Whilst the impact of sound career guidance is difficult to quantify, given its long-term nature, the positive reception of the game and high number of views generated for the educational content, showed this is a promising area for the application of game-based techniques.

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[1] http://metycoon.org/

II. BACKGROUND

As technology evolves to support an increasingly diverse range of complementary supports, various forms of technology-driven intervention have already been integrated into teaching and learning methods, including digital games. In such a context, games must be able to demonstrate effective learning (to be pedagogically-driven) whilst also remaining engaging and entertaining (to be fun driven), in tandem with Bloom's consideration of cognitive and affective domains [5]. The engaging element of game technologies has been proven effective in formal and informal learning experiences in both blended and standalone contexts [6]. Gaming literature states several positive learning outcomes of using games: the development of social skills, cognitive abilities and motivation towards learning, social and emotional development [7], strategic decision making [8], logical and critical thinking [9], problem solving and collaboration [10], as well as communication and team-building skills [11]. Findings from other studies of games-based approaches to career guidance have shown some promising early results, showing that games may have the ability to stimulate motivation amongst players to collaborate and reflect on career goals [12].

Game-based enhancements to existing learning environments are often best deployed through a blended learning approach [13]. A more engaging platform/environment such as computer games will be able to complement existing services and support personally prompted transitions (for instance the evolution of personal circumstances represented by a role-play game). Such innovations are essential to support the emergence of a new generation for whom technology is often an integral part of their day-to-day activities [14]. This generation is able to migrate between existing and new technologies, building socially driven communities, and has high expectations of fidelity and dynamics from Virtual Learning Environments (VLEs).

A frequent question in serious games design is how to best embed pedagogically-driven learning activities and learning content. A common argument is that this content integration must not obstruct the engaging aspects of the game [15], though in areas where the subject matter does not immediately lends itself to an entertainment gaming analogy, this may prove challenging. One solution might be to exploit a blended approach to apply extrinsic motivation on learners to play, though this can be at at-odds to the frequently cited benefits of game-based approaches in stimulating intrinsic motivation. Isolating individual pedagogical elements and examining their relationship to game design is an obvious route [16], though one complicated by the reliance of these elements on other factors such as learner demographic, representational medium or learning context. The approach reported in this paper sought to apply an approach utilising established learning objects such as videos, yet rather than add them as supplemental or external components, are incorporated as integral parts of game mechanics encompassing existing principles [17]. As such the game could be expressed as a learning content management approach, which applies rules and rewards for content access to form the game dynamic.

III. THE METYCOON GAME

In tandem with the need to support both learning activities as well as entertainment features as described in Section II, this section details the design of MeTycoon, a game in which students are encouraged to explore and develop their own virtual life, wherein their decisions directly affect their prosperity, achievements and happiness. This game aims to get young people to think about careers and discover different types of jobs that they may not have previously considered, as well as provide an engaging online experience allowing players to get to grips with transferable skills and discover supplementary resources. MeTycoon also seeks to allow players to discover the changing nature of the jobs market and the potential areas of future growth as well as help players to better visualize and understand that today's careers are not always achieved through linear progression. The game was developed to target 13-18 year olds, using mixed media within a web-based 2D environment. The game relies upon character development and the collection of points which opens up new jobs and resources in the game. Whilst the game itself is animated and cartoon-like, it utilizes video interviews with people from different occupations, job profiles and interactive elements to engage users. The game includes skill levels replicating real world considerations and giving emphasis to social skills required, including household costs, qualifications and skills development required for accessing higher paid employment.

MeTycoon aims to stimulate young people's thinking about their career, allowing them to discover jobs that may not have previously thought of as a possible career. Players have the opportunity to explore and discover the ever changing nature of the job market, and realise that career progression does not always occur in a linear manner. As a role-playing game, the player assumes the role of a protagonist represented by an avatar, configuring its appearance. The game provides two levels of difficulty, the intent here being to provide a resource with appeal to both novice and experienced gamers, preventing the disruption that can result from a mismatch of task difficulty and learner ability [18]. Following a brief registration process, players have a range of choices and they can choose to further develop their career or academic path by either entering in education to obtain academic or vocational qualifications, or start their career as soon as they end compulsory education (see Fig.1.

Players have the opportunity to manage, search, and apply for jobs, as well as gaining promotions and changing career paths. They can manage their qualifications by choosing what to study and how (part- and full-time). They can also manage their friends, network, add new friends and send them gifts; comparing lives, jobs, money and happiness. Finally they can purchase virtual items from a shop using in-game currency, which can relate to hobbies, transport, accommodation and activities. Players are ranked in the game based on a range of metrics including happiness, wealth, jobs held, achievements completed and items bought. The game ends when the player reaches retirement. The retirement age increases throughout the

game in relation to events the player may encounter, such as aging population and healthcare improvements.
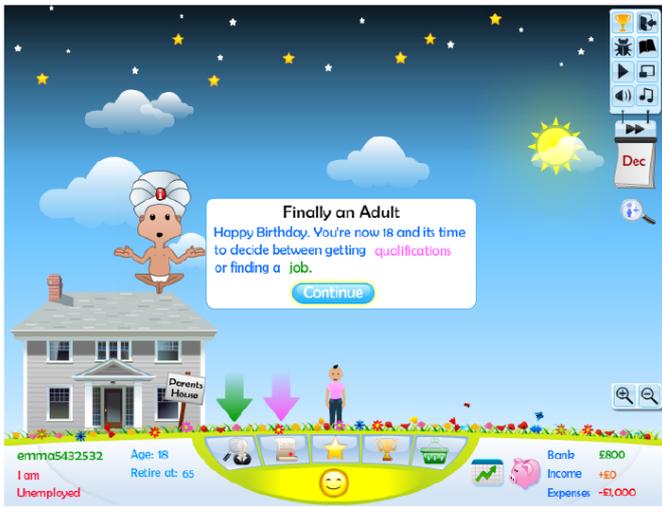

Fig. 1. The main gameplay area. Players support the costs of running a household by finding employment, using qualifications and skill development.
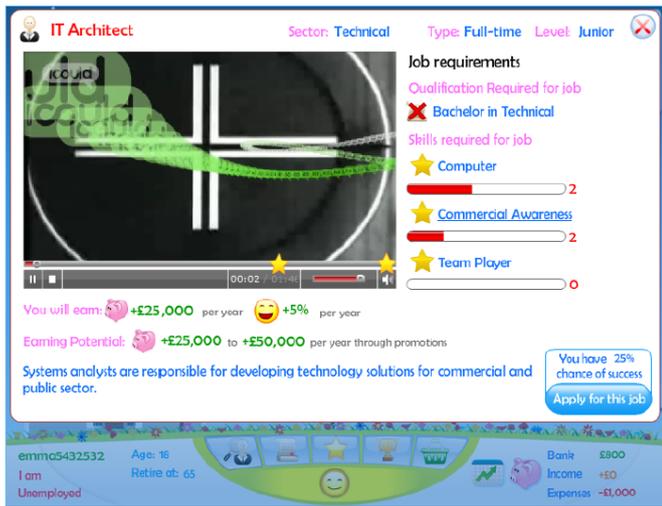

Fig. 2. Videos embedded within the game give detailed information on a range of professions. By viewing these videos, players unlock skill developers that can in turn be used to apply for better jobs.

A wide variety of jobs are included in the game, which covers 23 sectors. These jobs cover a range of professions from industries such as entertainment, public services, sports and leisure, and information technology. All of these professions are supported by embedded videos (Fig. 2), in which professionals explain their job and its day-to-day requirements. These are supplemented by a number of voluntary jobs such as graduate mentor, employment advisor, charity shop worker, or activity day helper. The jobs within the game require a range of skills at certain levels, varying from soft-skills such as communication, negotiation, and leadership, to a variety of hard skills such as numeracy and information technology skills.

In total 14 skills are covered. Additionally, qualifications that players can obtain are split into academic and work-based groups, which allow the players to apply for jobs and gain extra skills through study.

The game introduces a range of global and personal events at regular intervals, which can affect the player's current and future job prospects, including factors such as foreign investment, instant communication, environment and climate change, or poor work/life balance. The game is intended to be used in the classroom; however, it does not seek to exclude informal learning contexts. A blended approach to classroom delivery, outlined in associated guides for teachers and career guidance professionals, suggests an approach whereby the teacher introduces to the students the notion that work is a fundamental part of their lives, and therefore they need to start thinking about future careers and routes to achieve life goals. They are then encouraged to brainstorm about what they see themselves in 10, 20 or 30 years time, and emphasise that they need to start thinking how they can reach their goals. The students can play the game either individually or in pairs and pay particular attention to the range of jobs covered. In the end, they are encouraged to discuss the various jobs they encounter and especially if they found jobs that they never heard before and if their career plans have been affected by the game.

IV.   METHOD

The evaluation approach described in this section focuses upon the online audience for the game. In addition to tracking of large-scale users' online trends via Google Analytics, a survey was circulated to 800 players of the game, selected as they had explicitly opted to be contacted during the sign-up process. The questionnaire consisted of 10 closed questions and 1 open question asking what the best feature was and what could be improved. The players were asked to respond to the questionnaire after having played the game, and were not incentivized to respond to the survey (or indeed to play the game itself). In total 91 people responded to the questionnaire, and though not everyone responded to every question, the minimum number of responses for a single question was 88 (Fig.3). The average age of respondents was 22, though the data underlying this was split into two groups of school-age players and a small number of older individuals (54% of respondents were 16 or under 35% between 14 and 16). Qualitative data collected from the 1 open question (n=64) was content-analysed in order to establish the categories and frequencies which reflect the gathered data. This approach, based on generic content analysis procedures and principles, is applied to identify the most common themes emerging from this qualitative feedback.

Before you played MeTycoon did you know what jobs or careers you wanted to do in the future? (n=90)

- Yes
- No
- I had a rough idea

Did MeTycoon give you new ideas for jobs that you hadn't thought of before? (n=91)

- Lots of new ideas
- Some new ideas
- Not much
- None

Prior to playing MeTycoon, how much careers advice had you received? (n=91)

- A lot
- Some
- Not much
- None

If you answered positively to the previous question, how helpful was the advice you got? (n=88)

- Very helpful
- Quite helpful
- Not very helpful

Do you think its likely to have one job for the whole of one's life? (n=91)

- Very likely
- Possible but not likely
- Very unlikely

Where would you go if you wanted to get careers advice? [tick as many as apply] (n=91)

- Don't know
- Friends
- Parents
- Connexions or a walk-in centre

Did playing MeTycoon help you find out about what skills are important for getting a good job? (n=90)

- Yes
- No
- Don't know

Did playing MeTycoon help you learn more about what jobs might be available in the future? (n=91)

- Yes
- No
- Don't know

Who have you shared or talked about MeTycoon with? [tick as many as apply] (n=91)

- Nobody but I'm planning to
- Nobody
- Careers advisor
- Teacher
- Friends
- Parents

Fig. 3.   Responses from players to multiple choice questions

V.   RESULTS

With respect to the large-scale data obtained through monitoring of site usage, geographic information obtained via IP address geo-location demonstrated 75.2% of 38,097 visitors to be from the UK, 18,4% from the US and 6.4% from elsewhere. Since the game itself is embedded into the web page, it can be assumed that players geographic spread was similarly distributed. An event trigger was embedded into the game to monitor their number of views through Google Analytics. The average visit duration was 14 minutes 43 seconds, demonstrating the added value of the serious game in creating web content which is capable of retaining users beyond durations that might be expected of more static web content. Similarly, the 38,097 unique visits were generated from a total of 81,341 suggesting a significant proportion of players were returning to the game for a second play-through. As the game was embedded into the web page and designed to load immediately on a site visit, these figures are equivalent to the duration of play for the game itself. Event markers were embedded into educational videos within the game, in which professionals describe careers in live-action interviews, to establish some understanding of how frequently these core pedagogic elements were accessed. In total 408,247 video playbacks were triggered, demonstrating that this content was accessed and viewed extensively. This is an encouraging indication of how embedding pedagogic content in an interactive game might encourage and motivate users to view more conventional components such as instructional videos as part of the wider gaming experience.
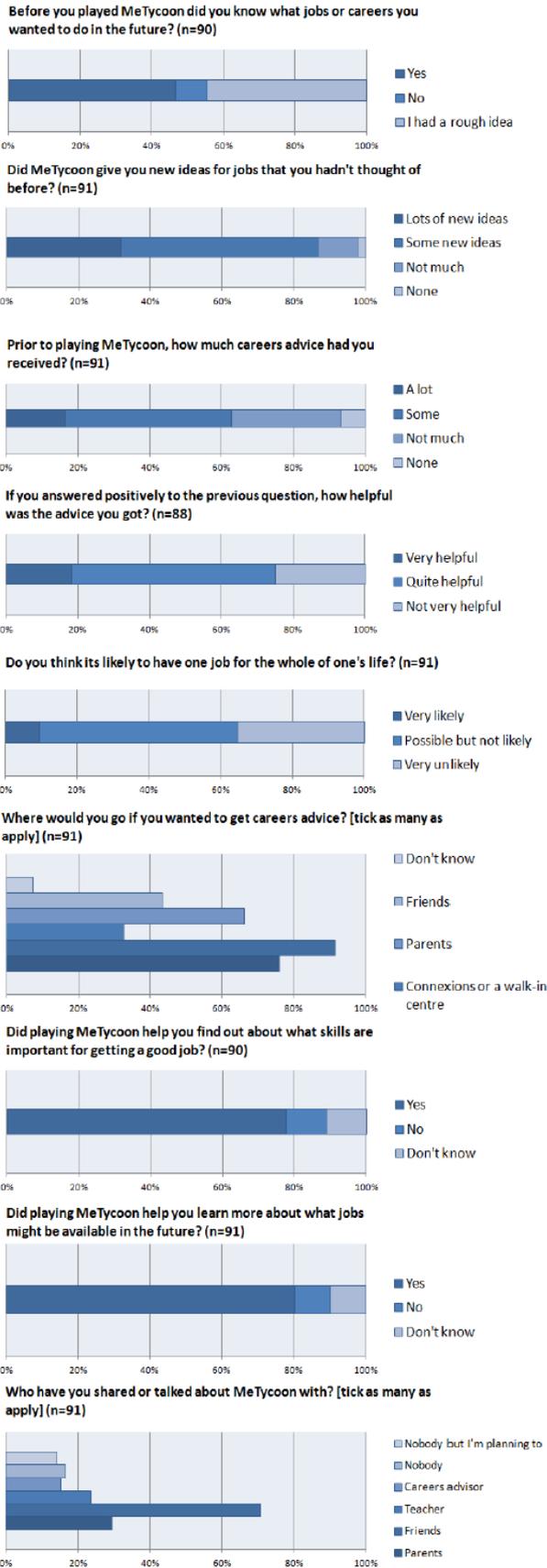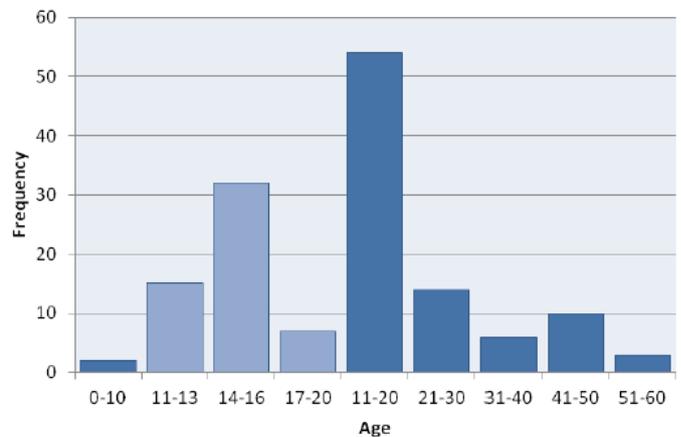

Fig. 4.   Age distribution of age respondents (n=91)

Survey results (Fig 3) showed a positive reception amongst players. Though almost half (47%) of players stated they knew what career they were intending to follow before playing. 87% stated that playing the game had given them new ideas. The role of the game as a supplement, rather than alternative to existing careers guidance methods was reinforced by the fact that 93% of players has experienced prior guidance, although only 17% reported having "a lot of" prior guidance, and of the players, and of the players that has received prior guidance, 25% described it as not "very helpful". 78% of players agreed that playing MeTycoon had helped them learned about which jobs might be available in the future. A further positive funding

was that 66% of players purported to have shared or talked about the game with friends, suggesting the game-based approach might have added value in stimulating peer discussions. In the discussion outlined in the following section, players' individual comments are reflected upon in light of these quantitative findings, allowing for some qualitative insight into individual perspectives.

VI. DISCUSSION

The assertion that the overall approach proved effective in creating a gameplay model which was unhindered by the instructional content was supported by a number of positive responses from players on the nature of the game itself:

> *"The game is fun as a game"*

> *"I loved this game and its not as if its lke all boring and its fun and interactive."*

The first of the above quotes is a commonly cited requirement of serious games [15], and that players independently noted this trait appears encouraging. Players also praised the interactive elements:

> *"The interactivity! Instead of searching around looking at skills needed for this and this, not only did I have a clear list [of] the types of skills needed for particular jobs, but also a video of a person in that type of job. That for me was very valuable and exactly what I was really looking for – an insight into jobs on a deeper level. The basic gameplay was fun and enjoyable, and it really opened my eyes to the wealth of jobs available out there"*

However, engagement must be coupled with learning transfer to ensure efficacy. Comments from players suggested that embedded videos were considered by many to be the key method of such transfer:

> *"its when I watched a video that helped me and showed me that I [have] something [I] am talented at"*

Given the high viewing rate the videos attracted, as noted in the previous section, this was again a positive response. The role of the game could be seen as providing an incentivized approach to content-management for these videos, as well as transferring information around themes such as required qualification and skills through the game-play model. In particular the videos were praised for the perspective they allowed viewers to gain into professions when compared with a more conventional instructor-led approach to career guidance:

> *"The idea of people talking about their own jobs and experiences, not advisors talking about someone else's career."*

> *"I liked the fact that you had to get the right qualifications for a certain job. I thought that was quite helpful so I know what sort of path I need to talk in real life I want to have a job in a certain career area."*

Whilst other games have been developed and deployed into schools or colleges for career support [12], these are dissimilar to MeTycoon in their more limited use and integration of pedagogically-defined multimedia elements. The results of the study show that video content was well used, and the ability of using the game to visualize future effects of jobs was notable. One user suggested showing more videos of people interviews at work, which would be an interesting addition to the game:

> *"Informative and fun! I would like to see more videos of people at work, that is not just interviews, but a glimpse of their work situation and the achievements they make"*

On a more critical note, some players did dispute the game mechanics and some of their implied choices. For thee players, the gameplay mechanics and defeating the game appeared moe important than the underlying pedagogic goals:

> *"[...] the choice whether you woud like a family or not. I found I was losing money of keeping my family when, for the circumstances of this game, I didn't want one"*

> *"As a game, MeTycoon has a solid foundation and, at least initially, has engaging game play that made me want to finish the game."*

TABLE I: CATEGORIZATION OF QUALITATIVE RESPONSES

Instances	Category
15	Choosing jobs & seeing the future effects
13	Careers advice & showing what qualifications are needed for what jobs
6	Comments on fun / engaging nature of the game
5	Generic praise
3	Life-action career videos
2	In-game graphics
2	Handling finances
2	Interactivity

In Table 1 we see a possible categorization of players into two types: the first group are searching principally for careers guidance and the second for an entertaining game. Such a distinction is evidenced through how the first group provided broadly positive comments and feedback, tending to focus on pedagogic elements such as the videos, whilst the second tended to focus more critically on game dynamics. Both these audiences are relevant to the game's objectives, though the latter may prove harder to reach in a meaningful fashion. Table 1 shows the categories most preferred by the respondents and how often the categories occurred in the answers. The feedback shows that respondents liked the game very much as the game was perceived as fun and engaging. The two most popular categories relate to careers advice, with these responses commenting positively on the game as a career advice tool.

VII. CONCLUSION

Conclusive assessment of the efficacy of careers guidance tools is difficult, given the long-term nature of their impact and wide range of cofactors influencing individual choices. The increased number of videos viewed and positive responses from players of MeTycoon in-part validates the approach taken, and highlights a promising basis for future work exploring how resources such as MeTycoon may be better refined, blended and delivered. More generally, the method of embedding learning objects such as informational videos not only within the game, but also as an intrinsic part of the gameplay, shows promise as a means to encourage players to interact with these objects without obstructing their enjoyment of the game. As learning objects become increasingly transposable and repurposable, serious games could prove an interesting medium for deploying these objects. Such deployments may, as MeTycoon demonstrates, capitalize on the engaging nature of gameplay to motivate and appeal to learners without compromising the pedagogic structure of individual objects. The overarching conclusion is that the importance of pedagogically-driven game activities complemented by engaging and interactive game mechanics would contribute not only in improving motivation, engagement and participation within a learning situation but will also provide useful scaffolds for improving students' learning and awareness on thinking about learning choices and career decisions.

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