GES APP – MOBILE APPLICATION TO SUPPORT REFLECTION AND DOCUMENTATION OF GLOBAL EMPLOYABILITY SKILLS

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ABSTRACT

In this paper, we present a mobile application, the GES App, designed to help students recognise, document, and articulate their employability skills to their prospective employees. Global Employability Skills are skills that students acquire that are in addition to their academic knowledge and skills, and that would help them in their careers. As students continue their university journeys, they often overlook or underestimate the importance of developing Global Employability Skills that employers consider as important for their jobs. The GES App is a mobile application designed to stimulate university students to reflect upon their experiences and assess the skills they may develop outside of their formal university studies. This paper presents how the GES App supports students plan their careers and develop their Global Employability Skills that would make them more attractive to their future employers. A use case scenario is described to illustrate the role the GES App could play, from the perspectives of university students, staff and employers.

KEYWORDS

Global Employability Skills, Self-Assessment, Career Planning, Mobile Learning, GES App

1. INTRODUCTION

Global Employability skills (GESs) are defined in the literature as skills that are graduate level abilities that are above the content of specific discipline and also practical and transferrable (Maciejewski et al., 2020), which are needed by an individual to perform a task and would make them employable. The significance of global employability skills for employment is inevitable. The focus of students' attention seems to be discipline specific knowledge and academic performance and they usually fail to anticipate the importance of GES in addition to their discipline specific skills during their academic journey. Literature highlights student's proactive

behavior towards career planning and preparing for their futures, e.g. (Clements & C., 2018). However, the challenge for making a connection between the GES acquired by students and what they learn at university and elsewhere during their university journeys still remain. Furthermore, finding the right candidates for fulfilling a company's requirement is not an easy task for employers and employers find it hard to spot the right candidate at job fairs or through job applications.

This paper describes the work conducted as a part of the European ERASMUS+ project on GES, with four European universities from Greece, Norway, Poland and the United Kingdom (UK). The main aim of the project is to develop a mobile application to allow students to plan, record and evidence the acquisition and development of GES throughout their university journey. The project started in 2019 and lasted 3 years. The GES mobile app, hereafter referred to as the GES App or the app, aims to support the GES from the perspective of students, academic staff and employers. The perspectives of the three types of users and/or stakeholders have been obtained during the requirement analysis phase of the project where interviews were conducted to investigate their interests and needs for supporting the enhancement and documentation of GES among university students. The requirement analysis highlighted the need for a mobile application by users as the efficacy and ability to provide timely access to learning in authentic working contexts (Herrington et al., 2014). The activities supported by the GES App are designed in the light of requirements defined by the three user groups, supported by the Self-Determined Learning Model of Instructions (SDLMI) (Shogren et al., 2019). This model is student or learner-centered and focuses on the learner's competencies and their capabilities and capacity to learn and enhance their skills.

The aim of this paper is to show the effectiveness of supporting the enhancement and documentation of GES for students, from the three different perspectives that play significant roles for employability of students in the industry. The main research question we wish to answer is: how can we design a mobile application to support students enhance their understanding of employability skills? To answer this research question, we developed a prototype mobile application and conducted evaluations. An overview of the GES App was presented at the IADIS Mobile Learning conference 2023. In this paper, which extends (Petersen et al., 2023), we describe the main functionalities of the GES App and how students may use it in career planning and enhancing their employability skills.

The rest of the paper is structured as follows: Section 2 provides a brief description of mobile learning and its relevance to this paper; Section 3 provides the theoretical foundations for the design of the app's concepts; Section 4 describes the methodology for obtaining requirements and GES App development; Section 5 provides an overview of the requirements from different perspectives; Section 6 provides an overview of the GES App; Section 7 describes a use case scenario and the main functionalities of the GES App, and Section 8 concludes the paper.

2. MOBILE LEARNING

Mobile learning or M-Learning is an umbrella term for incorporating mobile computing devices within teaching and learning (Grant, 2019). Most definitions associated with the concept of mobile learning emphasise the notion of mobility of learners. The term often includes a plethora of characteristics that relate to the "learning anytime and anywhere" (Haag & Berking, 2019, p. 233) appeal of using mobile technology for pedagogical purposes. Though several definitions

of mobile learning exist in the academic literature, the term often relates to learning that occurs "… across multiple contexts, through social and content interactions, using personal electronic devices" (Crompton, 2013, p. 4). The term mobile learning is also sometimes used interchangeably with the phrase ubiquitous learning as are the associated educational characteristics and benefits (Pishtari & Rodríguez-Triana, 2022). One of the central affordances of mobile learning is that it has the potential to enhance student engagement (Martin & Ertzberger, 2013). The autonomous and flexible nature of mobile learning associated with the notions of authentic and self-regulated learning has the potential to support student engagement. The portability, connectivity, and ubiquity of mobile devices such as laptops, smartphones and tablets mean that they are well placed to accommodate numerous learning theories and frameworks. From a teaching and learning perspective, the concepts of personalisation, authenticity, and collaboration (Kearney et al., 2012) aligned with mobile learning, make it applicable towards social constructivist and socio-cultural pedagogical approaches (Longman & Younie, 2021). Mobile learning activities, like other immersive technologies, can facilitate effective learning that has the potential to offer beneficial learning outcomes for students with activities that are "… personalised, relevant and offer opportunities for collaboration" (Kearney et al., 2020, p. 185).

Mobile learning has been recognised as a means to support lifelong learning (Fejes, 2014), which has been identified as an important employability skill (Sarfraz et al., 2018). Learning in this context has been considered broadly to refer to an activity that a person can do by her/himself (Biesta, 2006). The ubiquitous nature of mobile devices makes them a good means of supporting contextual and lifelong learning within a learning continuum, across multiple locations and situations (Luckin, 2010).

3. THEORETICAL FOUNDATIONS

Studies have shown that employment requirements from the perspective of employers varies from that of employees especially when they are students or fresh graduates that often results in complaints from employers with regards to workplace skills, work readiness and application of skills in non-academic environments (Jackling & De Lange, 2009). Therefore, to seek employment, students not only need to acquire a wide range of skills but also need to evidence the acquired skills as significance of generic skills surpasses the need of discipline specific skills (Tomlinson, 2008).

A detailed literature review conducted in the GES project revealed two important aspects that form the basis of the GES App design. First, employability cannot be guaranteed by skills, attitude, or knowledge individually and it is required to be a combination of the three to achieve the goal. Secondly, application of these skills in a workplace and practical life is more important than only possessing these skills that exhibits the competency required. Thus, the GES App is designed around the skills and knowledge of the user, but also provides resources to evidence and evaluate skills giving a way for users to show their competency.

The Self Determined Learning Model of Instructions (SDLMI) is a learner-centered learning approach, which focuses on the development of competency and the capability of a learner while building the capacity of learning (Shogren et al., 2019). The SDLMI approach has founded the basis of identifying activities of the GES App that allows a user to identify skills with self-determination while enabling them to explore the prospects to learn and practice those

skills. The activity to add a skill enables a user to know what they have learned, while the activity of a Dream job enables a user to determine what is needed to be learned, giving the user an opportunity to learn and practice through the activity of practice skills (Abbas et al., 2022).

Awareness can have a stimulating effect on the self-determined behavior of the student for which the process of reflection has been integrated. The model proposed by Rolfe et al. has been used as the foundation of the reflection process (Rolfe et al., 2001). Rolfe's model of reflection is also known as a reflective cycle and based on simple key questions of What? Now What? And So, What? These guidance questions are tailored as per the objectives of reflection and goal. The self-assessment of skills through a process of reflection is based on these guiding questions, which leads to the awareness and encourages learning.

4. METHODOLOGY

For the development of the GES mobile App, the Design Thinking methodology was used which not only offers benefits of user-centered methodology but is also recursive in nature (Plattner et al., 2015). The five phases of the Design Thinking methodology are empathise, define, ideate, prototype and test and the output of one phase is input to the subsequent phase. An interactive Figma prototype was developed to support the ideation process, which is described in (Iqbal, Fredheim, et al., 2022). The work presented in this paper is focused on the ideate and prototype phases where requirements from the users and the stakeholders were gathered, and the resulting Figma prototype was developed as the GES App. An overview of the different phases of the Design Thinking methodology and the output from the different phases are shown in Figure 1.
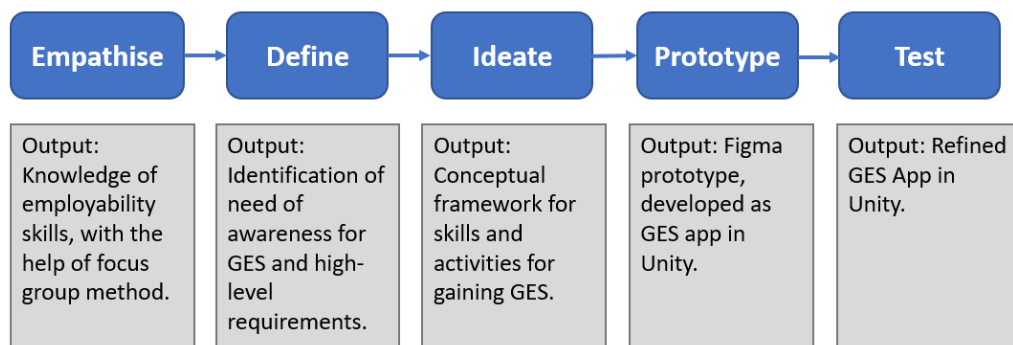

Figure 1. Design Thinking Methodology for the GES App

Requirements were gathered from the four European partners from Greece, Norway, Poland, and UK. Requirements gathering was conducted in two stages; the first was a qualitative study and focus group and semi-structure interviews with the different stakeholder groups: students, employers and academic staff. The second stage was a quantitative study using questionnaires, which was based on the results from the qualitative study. A total of 75 participated in the first stage: 43 students and 19 staff participated in the focus group interviews, and 13 individual employers were interviewed. In the second stage, 153 students responded to a questionnaire. The same questionnaires and interview guides were used for the participants from all the countries and the requirements gathering activities were conducted in the same time period. The

results were then analysed for the different countries and user groups to identify the functionalities for the GES App. The focus group discussions and interviews were conducted online due to the COVID-19 related restrictions and the questionnaires were administered using an online survey tool. Greek and Polish translations were used for the respective participants. Based on the requirements, a conceptual framework for the functionalities of the GES App and the activities it should support were defined (Iqbal, Fredheim, et al., 2022).

During the define and ideation processes, user scenarios were described, one of which is used in this paper to describe the functionalities of the GES App prototype, developed using the Unity platform.

5. REQUIREMENTS FROM DIFFERENT STAKEHOLDERS

The relevance of career aspirations and its psychological impacts have been discussed in the literature (Hoff et al., 2021). Studies have also shown that students have proactive career behaviors, i.e., career planning, skills development, career consultation and network building show stronger commitment to their career goals which has a statistically significant relationship with career success (Clements & C., 2018; Moeller et al., 2012). The qualitative analysis of the requirements gathered through interviews and focus group interviews in the EU ERASMUS+ project GES App identified three main groups of stakeholders for GES and their different perspectives. Hence, the mobile application for GES App incorporates three types of users' perspectives through various functionalities, as shown in Figure 2.
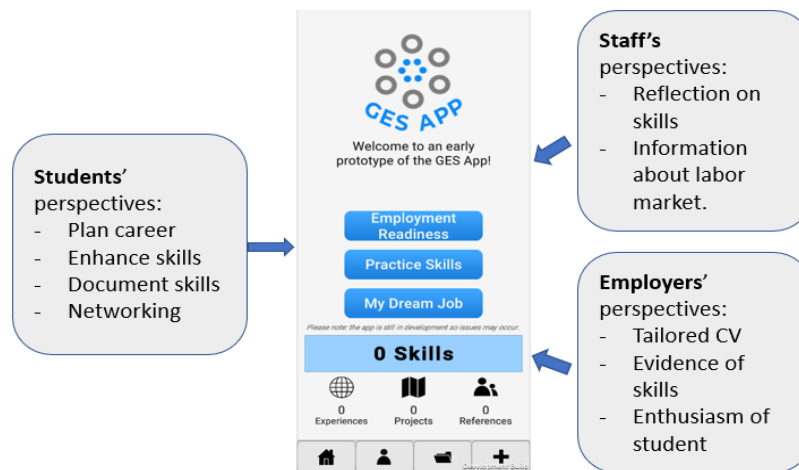

Figure 2. Different perspectives of Global Employability Skills

From the interviews with focus groups of students, it was established that students usually have a specific professional plan, although, they may also consider a plan-B as an alternative career path. Responses from students offer insights regarding their perspective of employability skills and the lack of specific skill-oriented training. It was also observed during the interviews that students acknowledge the fact that mere domain specific knowledge does not suffice the requirement of employability in the industry and most employers seek extensive skill sets along

with the need of experience. Students also identified the need for a mobile application, which could serve as an effective resource and indicate the need of tracking skills development, skill documentation in an authorised way, the need for networking, advice on how to acquire more skills, training for interviews, industry specific skill phrase bank, the possibility to set goals and to track what they know.

The interviews with employers identified some of the important qualities they look in a potential employee are, apart from the industry specific skills, the ability to learn new things, bring value to the company, a tailored CV and if they are able to keep their enthusiasm of working. The analysis of requirements enabled to envision some important functionalities of the mobile app that could enhance the prospects of employment for students, such as enabling them to present their skills with evidence of the skills, e.g., through experiences.

The perspectives of the academic staff, such as teachers and careers advisers, highlighted the need to support students to prepare for their employment and careers. This group of interviewees mentioned the use of a mobile app for enhancing the learning effects through reflections, modification of curriculum in the light of results acquired, and as an information channel for labor market skills.

6. OVERVIEW OF THE GES APP

The different perspectives highlighted through the requirement analysis identified the major activities that should be supported by the GES App. Thus, the functionalities in the GES App are based on five main activities, that support the development of students' GES. These activities are based on the literature and the key concepts, and the requirements that are summarised in Section 5. The main activities that have been identified to support the different perspectives, mainly the students, are summarised below:

1. Activity 1: Self-reporting, documenting and self-assessing GES. Users are able to add one or more Skills to their skill profile, assess their Skills level, set a Goal and relate the Skills to their Goal, reflect upon how and what experiences have helped them acquire the Skills and document the evidence of the Skills by adding Experiences, Artifacts and References (Iqbal, Fredheim, et al., 2022). This is illustrated in Figure 3.
2. Activity 2: Dream job. Users are able to define a Dream Job and relate to the desired list and level of Skills for the Dream Job (Iqbal, Abbas, et al., 2022).
3. Activity 3: Practice selected skills. Users are able to access learning resources that can help them to enhance their Skill set by learning a new Skill(s) or by enhancing the level of an existing Skill, e.g., by playing a game.
4. Activity 4: Networking and Ethics. Users are able to connect to other users and share their experiences and communicate through the GES App.
5. Activity 5: Employment readiness. Users are able to generate content for their CVs through the GES App, by accessing the Skills, Experiences, Artifacts and References from the GES App, practise for employment related activities such as learn about creating a CV and prepare for an interview.
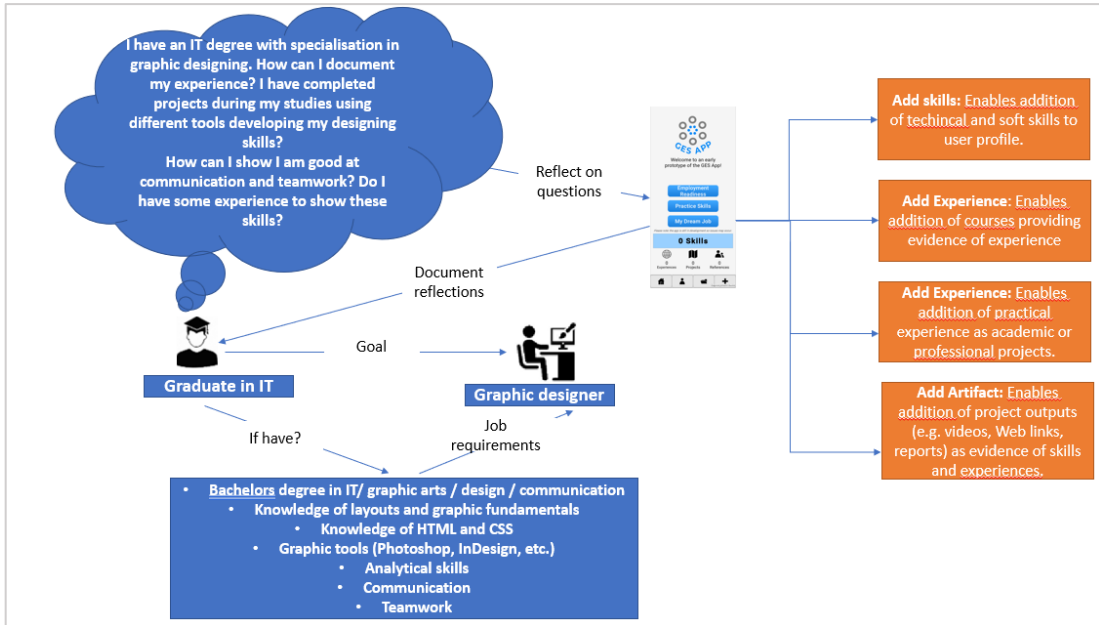
Figure 3. Design ideas for the GES App and its main activities

The original design ideas of the GES App are shown in Figure 4, where students can create their own profiles, add and update their skill sets, identify their dream jobs in addition to using the app to reflect upon how they intend to achieve their desired job role after their graduation.
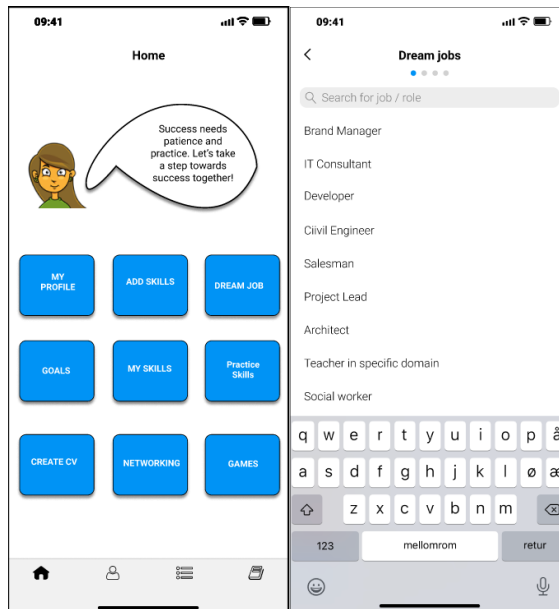

Figure 4. Figma Screenshots of Initial Design

Users are uniquely able to progress in the mobile app with a set user profile they may return to or a single instance no login approach. User profiles allow for the storing of data using Google Firebase. The service allows for connected account user profiles to store and comeback to their self-inputted data: activity 1, activity 2 and activity 5. Activity 3 and activity 4 are incorporated and the user does not need to input any data. An instance of a user profile is exemplified in Figure 5.
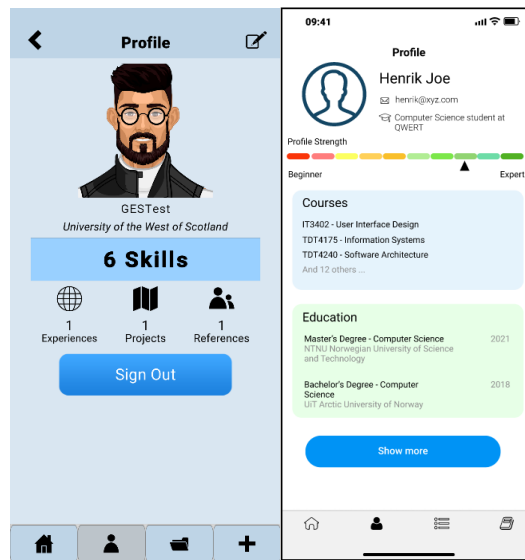

Figure 5. Initial and Final Design of User Profile of the GES App

All user profile accounts must connect using a username, email and password. Email and password are used to gain entry to the mobile app and retrieve the connected account. The user will have the option: sign in with an account or continue without. It is noted that continuing without a user account will result in all data being wiped and non-recoverable after closure of the app. A picture of user registration and login screens are shown in Figure 6.
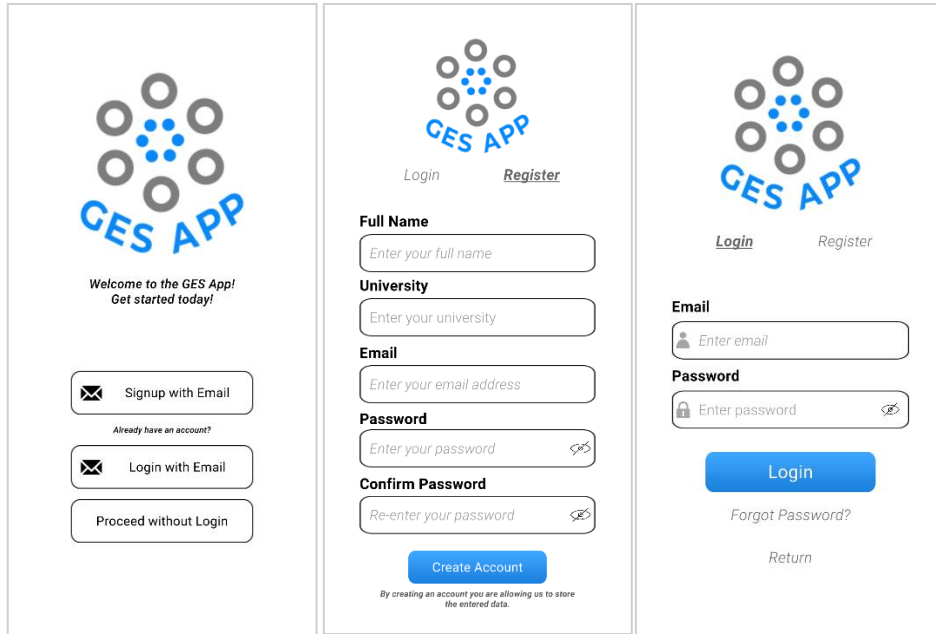
Figure 6. User Registration and Login Screens

The user interface design was assisted with the Figma designs given prior to development. This allowed for creation of a functional and consistent, dynamic user interface being used throughout the app. This is evidenced in Figure 7. The dynamic and interactive user interface in the Figma prototype allowed for consistency across the mobile app and the many devices to which it may support and the different viewing media available.
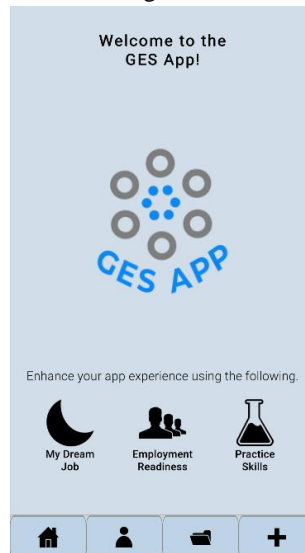

Figure 7. Home Screen

A dynamic user interface contributes to the initial development of the GES App. This allows the app development to be smooth and less problematic in further development stages. As the app progressed in development, this became apparent, and the integration of a dynamic user interface significantly cut down on development time in most areas.

7. USING THE GES APP

This section illustrates how the GES App supports a use case scenario, which includes three different stakeholders: student, employer, and careers advisor. Using ideas from user-centered design, we have created a persona for a student as shown in Figure **8**. Sarah is a student, who is focused on getting an interesting job after completing her university studies and is actively looking for job opportunities and preparing her CV and job applications. She is concerned about creating a good CV that will make her attractive to her potential employers and she is keen to find good ways to present her skills and experiences to potential employers. Thus, Sarah decides to get an appointment with the university's careers adviser, Joe. She was told by the Careers Adviser that she should carefully consider the skills and experiences she lists in her CV, and they should be tailored to the job position, to have maximum effect.

Sarah

Sarah is in her 2nd year of studies at university, studying Biotechnology. She has a part-time job in the local supermarket, to earn some extra money. She does not know what job opportunities she could have with her studies.

Hobbies & interests
- Plays the guitar in a band
- She is open-minded

Tech
- Social Media
- Mobile Games
- iPad for note taking
- Online Shopping
- Apps for story telling
- Early adopter

Wants
- A job and career where she could use her education as well her other skills through her part-time job and his music band.

Concerns
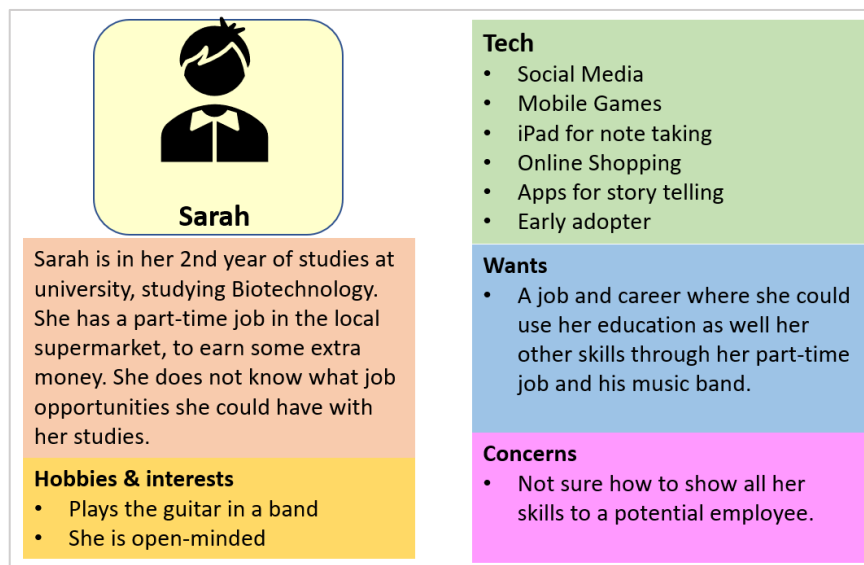- Not sure how to show all her skills to a potential employee.

Figure 8. Persona of a university student planning to apply for a job

Sarah uses the GES App regularly and records all her skills in the app. She sets a goal using the Dream Job functionality (activity 2) and explores the diverse career paths that are possible with her set of skills. She discovers a selection of learning resources in the GES App, in the form of games, videos, YouTube and other online sources. Sarah browses through her skills stored in the GES App and wonders if she could use some of that information as a part of her CV. Sarah explores the GES App to see if this is possible and she finds the functionality to create a CV. She selects the relevant Skills and the related Experiences, References and Artifacts

that she would like to include in her CV and exports them as an editable file. She receives the exported list of Skills as an email message. She copies the contents into her CV template and edits the format and adapts her CV to the needs of the job. Sarah found this to be an effective means of tailoring her CV.

Sarah attends a jobs fair at the university and comes across a company that she would like to apply for a job and meets Helen, the head of Human Resources (HR). Sarah accesses her skills profile overview in the GES App and asks Helen about the possibilities of getting a job in her company. Sarah happily explains her experiences and the skills that she has acquired how those skills could be relevant for a job in the company. Sarah feels that she has a better idea of the skills that she needs to focus on. Sarah leaves the stand very motivated and excited, and very glad that she had been using the GES App.

The following sub-sections describe how the GES App functionalities support the main activities identified through this user scenario.

6.1 Documenting Skills and Evidence of Skills

To document the skills, the student selects the option of "Add Skill", which provides the possibility to select a skill from a skills repository in the app, as shown in Figure 9 (a), or add a new skill, as shown in Figure 9**Error! Reference source not found.** (b). The student is asked if she wants to share the added skill as shown in Figure 9**Error! Reference source not found.** (c) and if option of sharing is selected by the student, the skill is added to crowdsourced skills repository in the GES App. Once the skill is added to the student's profile, the app enables the student to assess the skill through reflecting upon her level of the skill and she can define her level as novice, advanced beginner, competent, proficient, and expert, as shown in Figure 9 (d). A summary of the skill can be viewed in the profile as shown in Figure 9 (e), where the skill is listed with skill level.
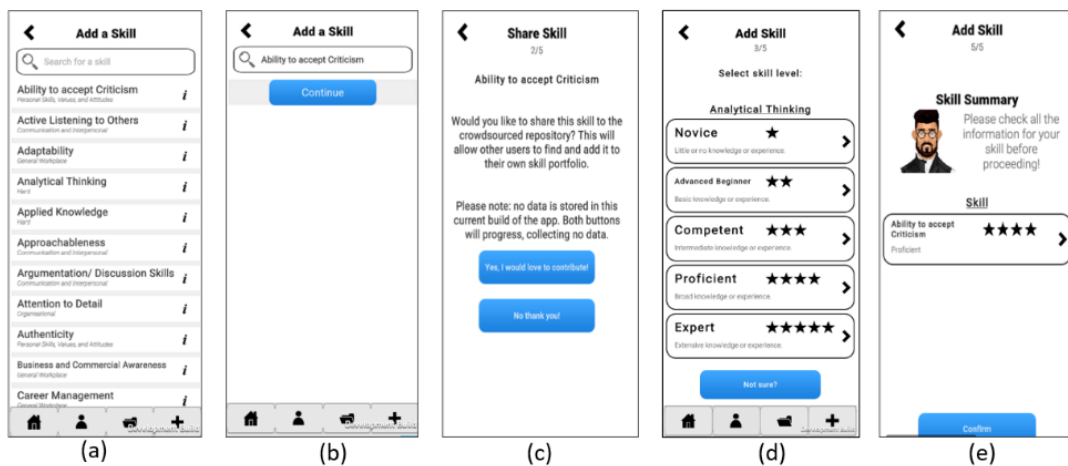

Figure 9. Documentation and self-assessment of Skills in the GES App

Students also need an effective way to prove the competency in the skill for which the evidence can be recorded in the app in the form of Experiences, Artifacts and References. Recording the evidence to support the reported skill allows student to showcase the practical expertise that can be acquired during a project, job, internship as an experience, some substantial output from the experience in terms of videos, reports, paper, online links, etc., or it can also be some human reference that can validate the competency of a student in that skill, such as a referee from academia or industry.

After adding a skill in the GES App, as shown in Figure 9**Error! Reference source not found.**, students can also add the evidence of a skill and can record experiences through the "Add Experience" functionality, as shown in Figure **10** (a). The GES App asks the student to add dates during which the experience was acquired, as shown in Figure **10** (b). Then, the student needs to identify the skills from the list of saved skills that are practiced or acquired through the recorded experience as shown in Figure **10** (c). The GES App also enables students to assess the experience through a series of questions in terms of very good, good, moderate, little, and not at all, as shown in Figure **10** (d). Once all the information is recorded, the student can view the summary of the added experience, which is shown in Figure **10** (e).
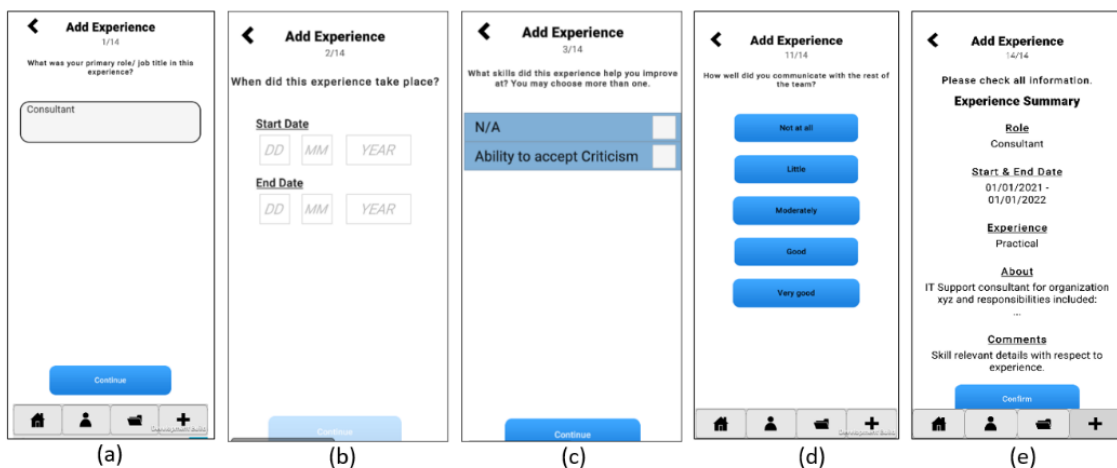

Figure 10. Documentation of evidence of a Skill as Experience in the GES App

Similarly, students can also record and upload artifacts through "Add Artifacts" option of the GES App, and add the relevant details for the added artifact, such as which skills were enhanced during the development of the artifact. The "Add Reference" option allows the student to add references, similar to those that would be included in a CV, where the student can also add the contact details of a reference, if consent has been sought.

6.2 Creating a CV

Exploring further, students can also extract all the saved information regarding the skills in the form of an editable file. This is a functionality to support "Employment Readiness" as shown in Figure **11** (a), and the "Create CV" functionality, Figure **11** (b), which facilitates students to create tailored CVs for job applications. Students can select the relevant skills from the list of skills in

their profile and the experiences, artifacts and references associated with the skills, as shown in Figure **11** (c). The app then displays a summary of skills and other information that have been selected, which could be exported as a text file. This provides an effective way of identifying the relevant skills and starting to create a CV. The contents from GES App could be imported/copied into the desired template for a CV.
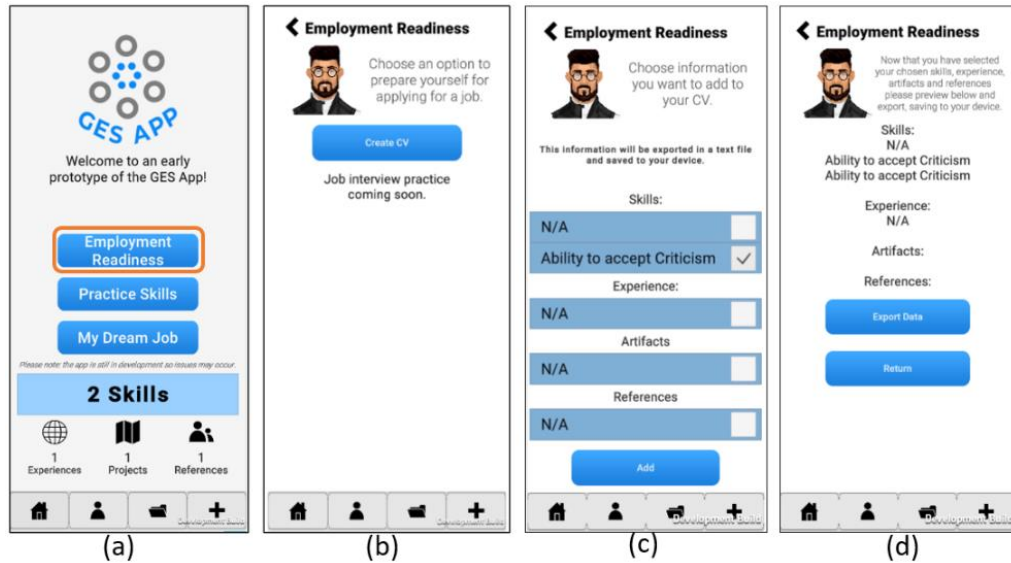

Figure 11. Creating a CV

6.3 Reviewing and Presenting an Overview of Skills

When a student meets the careers adviser or a potential employer, it is helpful to be able to present an overview of their skills. The GES App functionalities support the perspectives of staff and employers. Staff such as career advisers have a need to consider the skills and experiences of a student before giving advice regarding their future possibilities and to encourage students to use tailored CVs for the specific job opportunities. Similarly, an overview of a potential employee's (e.g. a student's) skills and experiences would enable them to obtain an impression of the student. More importantly, how a student assesses her level of skills will, no doubt, help career advisers as well as employers to obtain a sense of the student's enthusiasm and advise them on how to further enhance their relevant skills. The overview of skills that is available in the GES App facilitates all three perspectives.
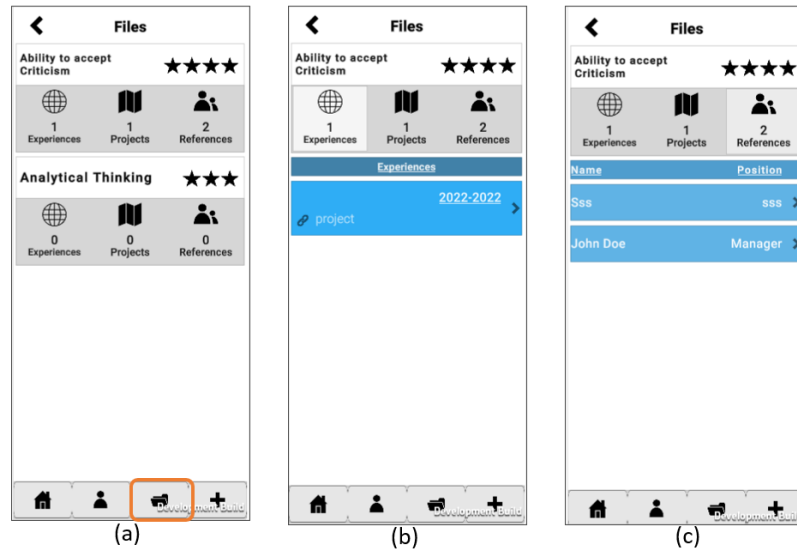
Figure 12. Overview of skills (skills profile of a user) in the GES App

An overview of a student's skills is summarised in the GES App as shown in Figure **12** (a).
They are presented as a set of skill cards, where each card displays the details in terms of skill
level, number of experiences during which a specific skill has been practiced, number of
artifacts for which the skill has been applied and the number of references that validate the
acquisition of the skill. Such details could support academic staff to provide personalised
counselling services to students and can also guide them for improvement in terms of career
goals student aim to achieve.

When a skill card is selected from the list, the GES App displays the detailed overview of
that skill as shown in Figure **12** (b). The skill recorded by the student can be explored further for
details of the evidence recorded, such as the details of experiences recorded, or details of
references recorded to support the skill, as shown in Figure **12** (c).

8. CONCLUSION AND FUTURE DEVELOPMENT

In this paper, we have presented a mobile application, the GES App, designed to help students
recognise, document, and articulate their skills to their prospective employees. The GES App
was designed to stimulate university students to reflect upon their experiences and assess the
skills they may develop outside of their formal university studies. The main research question
for this study has been how we could design a mobile application to support students enhance
their understanding of employability skills. To address this, a prototype of the GES App has
been developed and some of the main activities supported by the app has been described in this
paper. The GES App has been evaluated by students from Greece, Norway, Poland, and the UK,
where pre- and post-intervention questionnaires were used. The results are currently being
analysed. Preliminary results of the analysis show that the participants had positive comments
about the idea of the app, the organisation of contents in the app and the functionalities. They

found the app meaningful, important, original and motivating towards exploring many aspects of their employability skills and attitudes. They felt that the app has a good level of game flow, usability, and learnability and that the expected outcomes are important since the app could support students toward exploring and reflecting on their employability skills. Furthermore, the results also showed that the participants showed an increase in their understanding of the labour market and how to prepare for employment.

The current version of GES App is available in Google Play for Android devices. In the future, we aim to enhance the functionalities in the app to support students based on the feedback from the evaluations. One of the main limitations of this study is that the evaluations have so far been limited to students and the lack of feedback from the other stakeholders. Furthermore, an evaluation of the GES App from the perspective of the learning and enhancing competences needs further investigations.

Our future work will focus on conducting further user evaluations with the different stakeholder groups such as academic staff and employers, in the different countries. In addition, we continue to analyse the results from the studies reported in this paper and the feedback from them will be used to improve the GES App capabilities and improve our evaluation methods. In terms of enhancing the GES App's continued development, additional work on the app will involve ensuring that it remains cross browser and platform compatible and responsive. Current web accessibility issues will be reviewed when required to ensure that the app conforms to the latest standards associated with web accessibility. Additional development will focus on additional extra authentication options available to the user when registering or signing into the GES App including services such as Google, Apple, Facebook, and Twitter.

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