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BRIDGING EDUCATION AND EMPLOYMENT: A DIGITAL CAREER GUIDANCE ECOSYSTEM FOR SRI LANKAN YOUTH

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ABSTRACT

Sri Lanka faces a persistent challenge of making youth ready for employment through reading labor market signals, aligning personal preferences, and assessing career aptitude. A systematic career guidance ecosystem is needed to bridge the gap between the education system, the labor market expectations, and the individuals' career preferences. Given the importance of proper career guidance and career counselling and more importantly, the paucity of such facilities in Sri Lanka, this action research proposes a comprehensive system- NextStep, a web-based career guidance and career counselling platform. The research objectives are twofold as developing a prototype of a digital career guidance ecosystem and expanding social learning theory to today's ICT driven world. It features aptitude assessment, course exploration, and professional career counselling facilities targeting informed career decision-making by the youth. Agile software development methodology is used for iterative feedback and continuous improvement. The microservices-based architecture built on ReactJS for the frontend and Spring Boot with MySQL at the backend ensure future scalability and maintainability, and system security. The key functions of the system are role-based access control, career preference identification quizzes, course search, chatbot to recommend career opportunities, and facilities to meet professional career counsellors. NextStep is developed after studying existing local solutions, which do not serve the purpose of inclusive career guidance, instead acting as information catalogs. This research has demonstrated how IT-driven interventions help prepare youth for more informed career decisions and minimize career frustration and skill mismatch. Authors believe that the system usability can be further improved if a mobile application is integrated. This research invites national educational authorities to implement it country-wide after scaling it up, mapping national

educational policies and taking into consideration the IT literacy and resource distribution of the country.

Keywords: Action Research, Agile Methodology, Career Counselling, Career Guidance, Sri Lanka

1. Introduction

Sri Lanka faces a continuous challenge in preparing youth for future employment by making them aware of job market demands, career path opportunities, and helping them become self-aware about their aptitude for certain career paths. Even though the National Education Policy Framework 2020–2030 (National Education Commission, 2020) prioritizes career counselling and guidance as essential services, such services are not equally distributed among educational institutions. Meanwhile, the Annual Labour Force Survey of Sri Lanka by the Department of Census and Statistics (DCS, 2024) reports a higher underemployment and skill mismatch in the labour market, which might be causing from limited career preparedness among youth. Though some applications are available locally, such as CareerMe (CareerMe, 2025), Tertiary and Vocational Education Commission Career Guidance Portal [TVEC], n.d.) and the National Apprentice and Industrial Training Authority (NAITA, 2025) website, the need for a well-resourced career guidance framework with career aptitude assessment and counselling facilities needs to be implemented at the national level. Such a facility would act as a coordinating and gap-filling mechanism between school education, universities, vocational institutions, and the labour market to minimize the skill mismatch and enhance youth's employability. Anchored on social learning theory as the base, this action research has extensively studied those locally available facilities and developed a comprehensive platform to guide students to make informed career decisions. The methodological choices of the research are made in consideration of future nation-wide scalability of the application for better inclusivity.

The objectives of the research are to develop a prototype of a comprehensive career guidance and counselling system and expand the application of social learning theory to today's ICT driven world. It provides access to widely available resources on courses, career paths, personalized recommendations, facilitates real-time inquiries, and provides access to professional career counsellors. The main users of the system are identified as students, career counselors, and system administrators. The system deals with the constraints of existing systems and ensures accessibility, matches with the youth's digital literacy, and national education policy coherence.

2. Literature Review

Around 300,000 students annually enter Grade one in schools in Sri Lanka, out of which nearly 100,000 students drop out after completing the General Certificate of Education Ordinary Level (G.C.E. O/L) examination (Ministry of Education, 2022). Only 150,000 students become eligible to enter state universities for their higher studies (Ministry of Education, 2022). The students falling behind in their educational journey need to be absorbed into the labour market more systematically and scientifically, for which they need to be directed to proper vocational training. Meanwhile, the students must be educated to select those vocational training courses that suit their aptitude, tendency in several career pathways, and personal preferences to avoid career frustrations in latter stages of employment.

Many students are ambivalent about personal preferences, skills, and career aptitudes and tendencies to select a career path from the beginning (Lipshits-Braziler et al., 2025; Azhenov et al., 2023). Meantime, many students are unaware of the available alternative career pathways, courses, and academic and vocational programs offered by universities and vocational institutions. Consequently, many students join the labor market without possessing the required qualifications and training and settle for jobs that do not align with their educational background, personal skills and preferences (Sanguino et al., 2025). Career guidance and counselling are key tools many countries use to align one's personal preferences and innate skills to match with available career paths and job market needs (Sanguino et al., 2025). A proper alignment of aptitude, skills, training, and necessary qualifications ensures long-term, sustainable career outcomes for individuals.

As per Ginzberg's Theory of Career Development (Ginzberg, Ginsburg, Axelrad, & Herma, 1951), an individual's career choices are developed over time as a result of personal experience and the information received, instead of an instant instinct. However, in the Sri Lankan education system, career guidance is not integrated into the schools for that age group to plan their career at an early stage and receive targeted education. Consequently, students complete their secondary education without access to proper career guidance, and in later stages, a career mismatch with skills and preferences leads to career frustration.

Career choices and IT driven career guidance facilities

Previous studies show that students' career choices are predisposed by own interests, family and socioeconomic pressures, self-efficacy and labour market signals such as perceived prestige of the job and their

availability (Lipshits-Brazilier et al., 2025; Azhenov et al., 2023). Due to lack of accurate information and confidence on choices, a skill mismatch is there in labour markets (Haryati, Purwanto, & Awalya, 2021; Sloane & Mavromaras, 2020; Salas-Velasco, 2021). Many still prefer a blended approach of digital and face to face contacts for career guidance while the willingness to use IT solutions for the purpose is strongly linked to the perceived usefulness, ease of use and digital readiness resulting in a preference to use them (Khurumova et al., 2023). Meta-analytics and systematic reviews conclude a positive effect of career guidance interventions on career decision-making self-efficacy and adaptability (Whiston et al., 2017; Wang et al., 2024).

Rooted in social learning theory, previous research established the claim that career planning education improves students' career readiness (Jingwen, Talib, Jiajian, Cuiping, & Xia, 2023) while recent research proves how IT-driven interventions are highly capable of improving career preparedness of youth (ex: Atay, Müftüoğlu, Şahin, & et al., 2024). The research by Haryati, Purwanto, & Awalya, (2021) proves a strong association between students' perception of career information services and their efficacy on career decision making. The initial expert feedback on the system indicates a strong potential of the current research to be utilized at the national level. However, formal effectiveness testing is beyond the current research's scope of prototyping.

As per the reports by the National Education Commission of Sri Lanka (NEC, 2020), at schools, career guidance services are limited or completely unavailable. In general, in Sri Lanka, the paucity of career guidance is mainly due to a lack of resource people in schools to provide such services and the inability to access updated information on career pathways. Consequently, students lack understanding of academic and vocational opportunities after GCE O/L and A/L (NEC, 2020), resulting in dropouts and entering unsuitable career paths. There is a growing mismatch between the labour market demand and the skills of graduates (DCS, 2020), for which lack of career counselling interventions might be responsible.

Few career guidance platforms are available in Sri Lanka, namely CareerMe (CareerMe, n.d.), Tertiary and Vocational Education Commission Career Guidance Portal [TVEC], n.d.) and services offered by National Apprentice and Industrial Training Authority (NAITA). CareerMe is a platform with both mobile and web applications, aiming to help students identify their personality traits and career paths through a psychological assessment. It is freely accessible and provides localized content. However, it does not provide a personalized counselling service, nor is it capable of providing feedback following the

initial assessments in the psychometric assessments.

The TVEC Career Guidance portal makes information available for users to know about various vocational courses and institutions, which seem to act as a course directory and therefore cannot be considered as a career guidance portal. It lacks personalized guidance, self-assessment tool kits, or facilities for inquiry to receive personalized recommendations.

NAITA organizes on-site workshops to provide career awareness and guidance but lacks digital infrastructure to cope with the youth's needs for timely information, real-time interaction, and further clarifications and counselling support. Their digital availability serves only as a web page that informs their upcoming career workshops.

Although the above existing platforms offer certain facilities, they do not fully serve the purpose of allowing youth to receive career guidance and counselling. Among several limitations, lack of interactivity, absence of real-time counselling options, lack of updated and comprehensive information about courses, and outdated user interfaces are prominent.

3. Methodology

3.1. Research Design

Agile software development methodology is used to develop NextStep. It ensures iterative delivery, continuous feedback, and adaptation to requirement changes (Highsmith, 2002), allowing incremental development in short sprints. Thus, users of the system are able to provide timely feedback on system features.

3.2. System Architecture

Microservices-based architecture is used in this system as it supports scalability, maintainability, and separation of concerns (Newman, 2015). Modules are implemented as independent services that communicate with RESTful APIs, ensuring components can be independently developed, tested, and deployed.

3.3. User Roles and Functionalities

There are three primary user roles with unique functionalities. *Students* identify suitable career paths by answering the system-generated quizzes, exploring universities and vocational training courses/programs, accessing details about programs, and interacting

with career counsellors via the meeting feature. The *counsellors* are expected to register with the system using professional credentials, which will be verified by the *admin* of the system, and the counsellor is able to mark his or her availability for consultations. The meeting feature is used to provide career counselling guidance. The admin controls the entire system and is responsible for credential verifications, managing course catalogs of the institutions, updating career quizzes, and monitoring the system performance through the interactive dashboard.

3.4. Technology Stack

The frontend user interface was developed using ReactJS. ReactJS facilitates component-based development and responsive design (Flanagan, 2020), and its dynamic rendering of data facility is essential to generate real-time updates in the admin dashboard and for the career quizzes to be interactive.

The backend development was performed using Spring Boot, a Java-based framework. Spring Boot is highly regarded for backend development as it simplifies robust, production-ready application development that has embedded servers and facilitates dependency management and supports REST API (Johnson et al., 2019).

Given the need for persistent storage of user profiles, course catalogs, quiz feedback, and meeting logs, a MySQL relational database was used for database management. Relational databases are preferred for structured data storage and support for complex queries while ensuring data consistency (Silberschatz, Korth, & Sudarshan, 2019).

For authentication and security, JSON Web Token (JWT) was used. It is useful to ensure secure user sessions and controlled access (Jones, Bradley, & Sakimura, 2015) and suitable for web-based microservices architecture as it provides a stateless and scalable approach to authentication.

3.5. Data Management and System Evaluation

The data management followed standard CRUD (create, read, update, delete) operations across all entities. Standard CRUD operations ensure data integrity and traceability for superior data management (Date, 2019). For the system evaluations, the functional testing, user acceptance testing, and performance testing were performed, and confirmed that all features meet the design specifications identified.

3.6. System Sustainability and Maintenance

relevant details such as full name, email, contact and supporting documents that verify them as a professional counsellor to the system through the counsellor signup page. The administrator has the privilege of creating accounts for counsellors, validating their credentials, modifying user information, and deleting accounts if necessary. As depicted in Figures 2 and 3, once the registration is complete, the users can log in to the system using their credentials. The user management module is centered around data validation, secure authentication, and user privacy protection.



Figure 2: Home Page

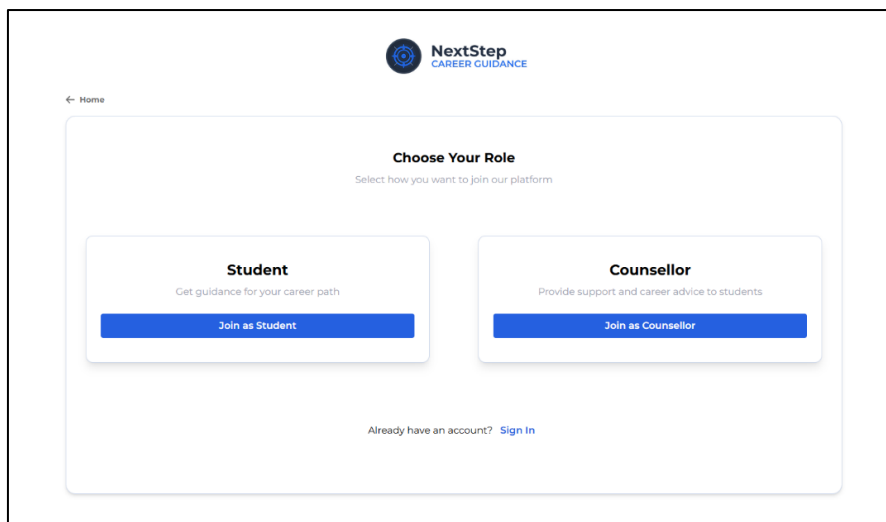


Figure 3: Role-based Signup

4.2. Preference Identification Quiz

As shown in Figure 4, preference identification is a key feature of the

system that allows students to answer a few structured multiple-choice questions (MCQ) and scale-based questions, and thereby self-discover own career-related strengths, preferences and interests. This MCQ was developed using Holland’s Theory of Career Choice (RIASEC Model) and Krumboltz’s Social Learning Theory of Career Decision-Making, which together provide a comprehensive foundation for understanding how individual interests, values, and learning experiences influence career preferences. Once the quiz is completed, the responses are processed using pre-defined evaluation criteria. The results are presented in visual formats for students to holistically view their career-related tendencies (Figure 5).

NextStep
CAREER GUIDANCE

Home Courses Quizzes Meetings Career Recommendations

Career Interest Quiz

What kind of activities do you enjoy the most?

- ☐ Writing code, solving bugs, or working on tech projects
- ☐ Caring for people or helping them recover from illness
- ☐ Leading a team, organizing events, or selling ideas
- ☐ Drawing, writing, filming, or designing creative projects
- ☐ Building, inventing, or experimenting with how things work
- ☐ Explaining concepts or helping someone learn something new

Which school subjects do/did you enjoy the most?

- ☐ ICT, Computer Science
- ☐ Biology, Health Science
- ☐ Business Studies, Accounting, Economics
- ☐ Art, Literature, Media Studies
- ☐ Mathematics, Physics
- ☐ Psychology, Logic, General Knowledge

Which of these goals resonates with you the most?

- ☐ Develop innovative technology or software

Figure 4: Preference Identification Quiz

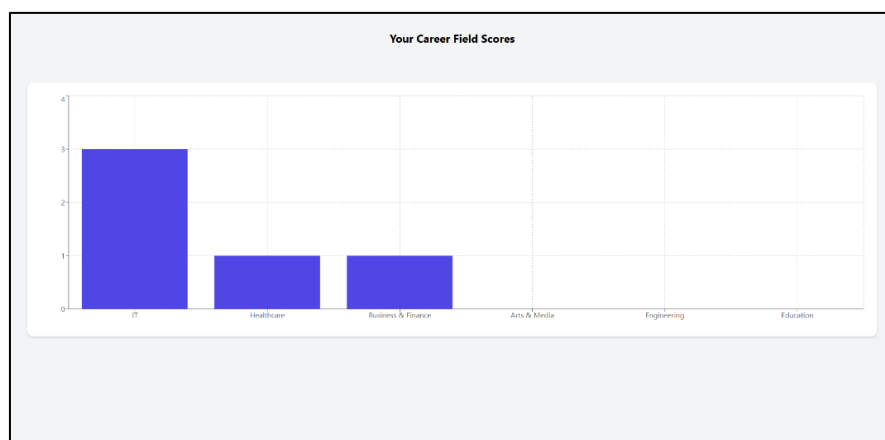


Figure 5: Quiz Result Chart

4.3. Course Service

The course service module depicted in Figure 6 provides students with

access to detailed information about a variety of educational and career courses. Searching for courses as per preferences, interests, by course name, field, or by the university is facilitated in the system. The entry requirements are displayed for each course offered by the state and private universities for students to make more informed decisions. The module ensures the displayed data is accurate, updated, and authentic.

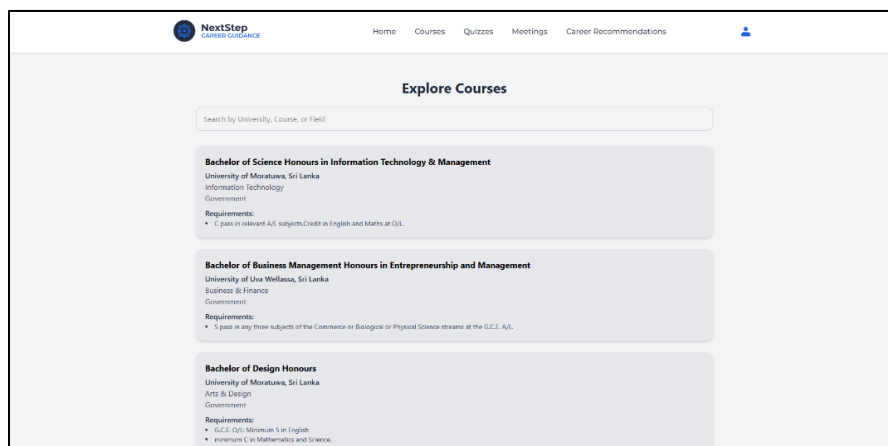


Figure 6: Course Service

4.4. Career Recommending Chatbot Service

NextStep encompasses a chatbot (Figure 7) that allows students to receive career suggestions through an interactive chat interface. The bot initiates the conversation by asking a series of questions from the students to recommend career options and provides detailed descriptions of each inquired option. To make sure the recommendations are consistent and relevant for the user, the chatbot operates on a rule-based mechanism.

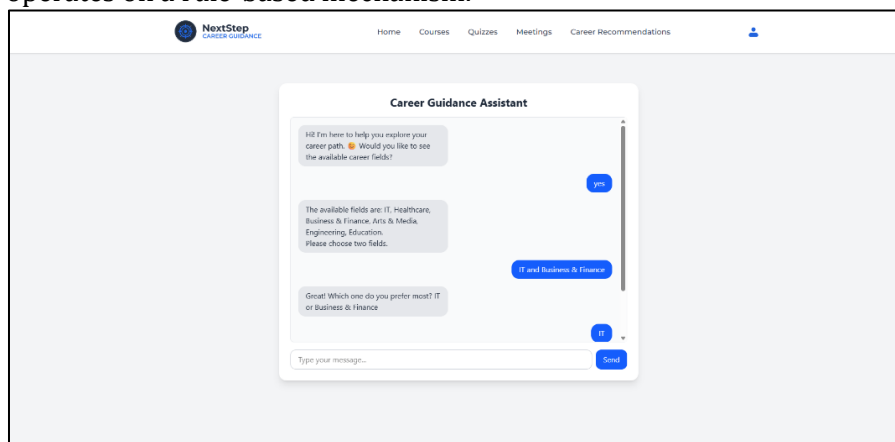


Figure7: Career Recommending Chatbot Service

4.5. Meeting Management

The meeting management module is responsible for creating a safe space for student-counsellor communication on the system. After obtaining a comprehensive understanding of oneself career preferences, available options and clarifications from the chatbot, if needed, the student is further able to receive assistance from a professional counsellor in the system. The system facilitates scheduling one-on-one counselling sessions. For this purpose, students can view counsellors from the meeting booking page, which displays each counsellor's information, areas of expertise, and available time slots. Students can then select a counsellor and proceed with the payment through the system. At the agreed time, the student can log in to the system and join a virtual meeting room, which has real-time audio and video facilities.

5. Conclusion and Implications

This action research presents the design and development of a web-based career guidance and counselling system *NextStep*, aiming at providing Sri Lankan youth a reliable, accessible, and personalized career guidance. This comprehensive system fills the gap in the existing national career guidance infrastructure of the country. Presently Sri Lankan youth lack access to verified information about various career paths, access to career counselling, and tools to assess their own career interests to map with suitable academic and vocational pathways.

The system serves a wider coverage of stakeholders to be the users. The system features include preference and skill assessment, access course details, chatbot facility for clarifications, and real-time counsellor interaction, making career exploration and administration easy. Microservices-based architecture ensures integration of core functionalities and role-specific tools and responsibilities by forming a sustainable career guidance ecosystem.

Though the system laid a strong foundation for a nationwide implementable comprehensive career guidance platform, it inherits several limitations. The current development version is limited to web access, but users may prefer mobile applications. Since wider accessibility is expected from this type of application, a web-based application might limit accessibility, especially in low-resource areas. Given the mobile phone facility usage in Sri Lanka, a mobile application of the same system might ensure the system reaches the target population. Though the web version is designed to be mobile responsive, a separately developed mobile application would provide a higher user experience.

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