Journal of Information Systems and Informatics
Vol. 6, No. 4, December 2024 e-ISSN: 2656-4882 p-ISSN: 2656-5935
DOI: 10.51519/journalisi.v6i4.873 Published By DRPM-UBD

Requirements for a Technology-Supported Students' Career Selection Model: Insights from Social Cognitive Career Theory

Moses K. Tuhame[1], Barbara N. Kayondo[2], Annabella B. Habinka[3], Gilbert Maiga[4]

[1,4] Information Systems Department, Makerere University, Kampala, Uganda
[2]Information Systems Department, Makerere University Business School, Kampala, Uganda
[3]Information Technology Department, Makerere University, Kampala, Uganda
Email: [1]tuhamose2@gmail.com, [2]bkayondo@mubs.ac.ug, [3]annabella.habinka@cit.ac.ug, [4]gilmaiga@gmail.com

Abstract

Inappropriate career choices at the secondary level contribute to challenges like high university dropout, delayed course completion, and frustration. While ICTs play a growing role in career guidance due to evolving technologies, many aspects of technology-supported systems remain under-researched. This study addresses the gap by investigating the requirements of a technology-supported career model for secondary school students basing on the Social Cognitive Career Theory. A mixed-methods approach was used, in line with the pragmatism paradigm. A survey was conducted on a random sample of 784 Ugandan students from 15 secondary schools and 1 university, while qualitative data was collected through interviews with 17 purposively selected key informants. SPSS and NVIVO software were used for data analysis. EFA and CFA confirmed the factor structure of instrument scores. Study results revealed that all the 7 variables under study were valid. Results indicate that career decisions are influenced by parental guidance, role models, financial constraints, media exposure, and self-efficacy, with students generally showing moderate confidence in their career choices but facing challenges related to external pressures and decision-making complexity. Therefore, requirements for the technology-supported model should include student personality assessment, digital internships, success stories, workshops, discussion forums and detailed information about career progression.

Keywords: Requirements, Social Cognitive Career Theory, Career Choice, Technology, Career Decision Making

1. INTRODUCTION

The recent amendments in the secondary school curriculum to a competence-based curriculum in Uganda [1], coupled with dynamism in the market trends require supporting secondary-level students during career selection [2]. Traditional methods for career guidance, lacking in technology, struggle with outdated student information, insufficient personalized advice, and a lack of accurate job demand data, leading to misaligned career choices [3]. Technology-supported career

guidance helps in assessing students' personality and job market data to provide personalized and relevant career guidance to students [4], [5]. However, empirical evidence reveals that the traditional methods unsupported by technology have persistently posed challenges in career selection, such as infrequent access to students' data [6], [7], personalized career guidance [6], and inadequate information about industry demands [8], [9]. These issues have resulted into a mismatch between students' career choices and their abilities. The challenge of this mismatch has persisted [10], which is attributed to the lack of adaptive, real-time, technology-driven solutions to career guidance [11], [12].

Despite technological advancements and the increasing availability of data analytics tools, their use in supporting career selection remains insufficiently explored and underutilized in the context of education [13], [14]. This points to a broader issue in the evolving field of information systems, where dynamic, real-time solutions are paramount, yet there is a disconnect between technological potential and its application in the educational context. The application of technology in career selection should be supported by a comprehensive career choice framework such as Social Cognitive Career Theory (SCCT) [15]. According to the Social Cognitive Career Theory (SCCT), successful career selection involves an amalgamation of relevant factors to arrive at an optimal choice [16], [17].

Previous studies have revealed that the utilization of technology facilitates career selection, by integrating these factors into students' career decision-making [18]. For instance, interactive interfaces and mobile applications offer platforms for students to engage in personal-assessment exercises, career exploration sessions, and job information search, empowering them in career decision-making [19], [20]. Further, technology facilitates collaboration and communication among stakeholders in the career selection process, including students, parents, educators, policy makers and industry professionals [21], [22], [23]. Moreover, technology-supported career selection gives students access to up-to-date information on emerging career pathways. This increases their awareness about diverse career options and fosters informed decision-making [13]. Thus, the requirements for a technology-supported career selection model should enhance the exchange of valuable feedback, track students' progress, and co-create personalized career development plans that align with students' aspirations through the use of integrated information systems.

In this study tenets of Social Cognitive Career Theory (SCCT) are used to identify factors essential for developing a technology-supported career selection enhancement model [24]. In line with the argument of prior scholars, the key variables articulated within the SCCT framework outline the requirements for such a model [25]. The key variables in the SCCT encompass contextual influences (e.g., family, information and policies), background and contextual affordances (socio-

economic status, media access), learning experiences (vicarious learning experiences, masterly experiences), personal career goals (career targets), outcome expectations (desired economic and social benefits), self-efficacy expectations (perseverance, performance, emotional state), and career decision-making (data structuring, knowledge base, prediction). Leveraging technology to integrate these variables has a potential to transform career guidance practices and empower individuals to achieve their career aspirations in the digital age [26], [27], [28].

Several studies demonstrate that traditional career selection approaches are limited. These limitations are both theoretical, such as being "too cognitive", and pragmatic [29]. For instance, Merton's theory [30], Anchor model [31], and Holland's six career interest types [32] have been found lacking in terms of practical outcomes and require further examination. Moreover, [33] have reviewed the existing career selection models and found that while most of them emphasize that there are numerous factors affecting the career selection process, they do not fully address these factors for a wide range of fields. Finally, general trends in technological advancements, such as artificial intelligence (AI), machine learning, and data analytics [34], [35], [36] can adopt the identified requirements.

The purpose of this study is to identify the requirements for a technology-supported career selection model that leverages data from students, contextual influences and the job market among others. By positioning this model within the information systems domain, we aim to revolutionize career guidance by providing personalized support in line with the digital transformation of educational resources. Therefore, the contribution of our study is both theoretical and practical. Theoretically, the study enhances the applicability of the SCCT by illustrating how its principles inform the requirements for a technology-supported career selection model. Practically, our research provides a framework for developing technology-driven interventions that leverage students' behavioral data to provide personalized career guidance.

2. METHODS

The research adopts a pragmatism philosophical outlook, relying on both qualitative and quantitative approaches [37]. According to pragmatism philosophy, an ideology is true in case it works well [38]. This framework was selected because of its potential for the in-depth evaluation of the studied phenomenon, particularly the prerequisites for the development of the technology-supported career selection model. The qualitative approach is preferred for its ability to explore contextual determinants like career selection and different types of career guidance interventions by adding depth and context, leading to meaningful conclusions [37], [38]. On the other hand, quantitative approach complements the qualitative aspect by providing measurable data that can be generalised. These approaches were

p-ISSN: **2656-5935** http://journal-isi.org/index.php/isi e-ISSN: **2656-4882**

applied sequentially with quantitative data collected first. The flowchart of the research process is provided in Figure 1.

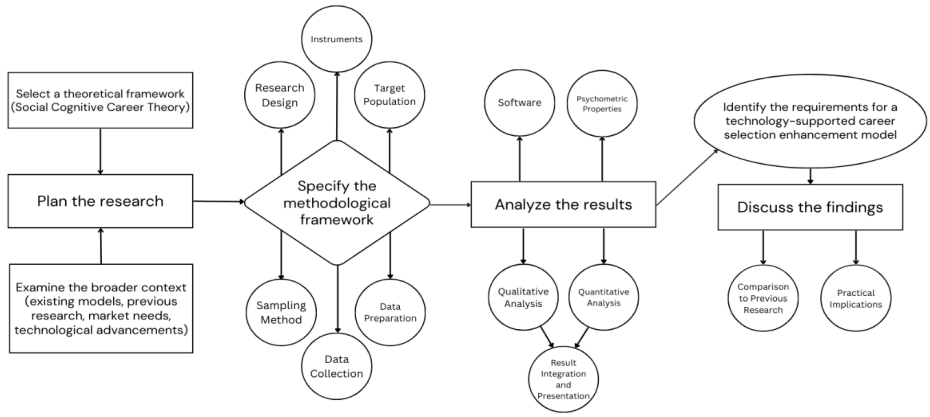

Figure 1. Flowchart of the research process

The target population includes students from fifteen secondary schools and one university and key informants from selected institutions in the Ministry of Education and Sports. Students were selected using simple random sampling while key informants were selected using purposive sampling. The students were selected from secondary schools located in Central and Western Uganda, specifically in the districts of Kampala, Mbarara, Kalangala, Kyegegwa, and Wakiso. University participants were students pursuing medicine, engineering, and business courses at Makerere university. The quantitative survey consisted of 784 students from the studied secondary schools and Makerere University. With a large study population (N>100,000), the target sample size (n) was determined using Cochran's Equation 1 [38].

$$n = \frac{Z^2 pq}{e^2} \quad (1)$$

We assumed that the proportion of the population with the attribute of interest (p) is .50. A desired confidence interval of 95% (Z=1.96) and a margin of error (e) of 0.035 were applied, with q defined as 1–p. The required sample size, n, is calculated to be 784. Out of 784 participants in the sample, 717 (91.5%) completed the survey, which is a satisfactory response rate [39].

The qualitative data were collected from 17 purposefully selected key informants out of the targeted 23. These included six School Career teachers (TR), two University Researchers (RC) in career guidance, a Parent (PT), Research Manager at National Planning Authority (NPA), Senior Officer at Public Universities Joint Admissions Board (PUJAB), Assistant Commissioner Guidance and Counselling

at the ministry of Education and Sports (GD), Software Developer (SD), a Curriculum Specialist at National Curriculum Development Centre (SP), two Graduates on jobs they professionally trained in (GT), and one Graduate on a job he did not professionally train in (GN).

Two instruments were used; an interview guide for key informants and questionnaire for students' survey. For both instruments, the items were developed basing on the variables in SCCT in order to gain a deeper understanding and quantification of the variables under study. The variables included 1) Contextual Influences, 2) Contextual Affordances, 3) Self Efficacy expectations, 4) Learning Experiences, 5) Outcome expectations, 6) Personal Goals, and 7) Career decision making. For qualitative data, a small group piloted the interview guide to ensure clarity and relevance of the items. Data saturation was monitored throughout data collection, and interview numbers were adjusted.

In the questionnaire, we adapted the existing questions to measure the study constructs on a five Likert scale of 1=" Strongly disagree", 2=" Disagree", 3=" Neutral", 4=" Agree", and 5=" Strongly agree."

1) Personal Career goals: Career goals was measured using four question items adapted from [40]. A sample item is: "I have a clear set of goals for my career after school"
2) Self-efficacy expectations: SEE was measured using a 7-item scale adapted from [42]. Sample items include: "I can always manage to solve difficult problems if I try hard enough", and "I can achieve most of the career goals that I set for myself."
3) Contextual influences: Contextual influences were measured using studies as a 7-item questionnaire advanced by [43]. A sample item is: "Teachers give appropriate guidance to students to enable them to make appropriate career choices ", and "Students usually abide by their parent's/guardians' career guidance irrespective of its impact".
4) Learning experiences: Learning experiences were measured using a four-item scale adapted from [17]. Sample items are: "The way I handled career-related decisions worked well for me in the past", and "I have role models who are good at making important career decisions".
5) Career decision-making: Career decision-making was measured by a 7-item questionnaire developed and advanced by [17]. Sample items are: "Putting together all information required for a better subject/career choice is complicated", and "I have had a hard time making important career decisions without help".
6) Contextual affordances: Background and contextual affordances were measured by a 5-item measurement questionnaire by [17]. Sample items are: "Lack of sufficient funding (school fees, materials) negatively affects one's

career choices" and, "I can access various media (radio, TV, newspapers) for career awareness".

7) Outcome expectations: Outcome expectations was measured by a four-item measure adapted from [43]. Sample items are: "The course/subjects I am doing will lead me to a job with better salary and standards of living" and, "The course/subjects I am doing will lead me to a job with better salary and standards of living".

The questionnaire items' internal consistency and factorial validity were evaluated. All constructs had Cronbach alpha (α) in excess of the threshold of 0.60, indicating satisfactory internal consistency in the context of exploratory research [44]. Since the instruments used to measure the constructs in our study have been previously validated, it was sufficient to inspect their factor structure on the Ugandan sample. Such a practice is typical in applied research [45]. For factor validity, standardized factor loadings, (λ), from Exploratory Factor Analysis (EFA) should be at least .50 (t>2.0) [46]. Since the λs were in excess of .50, all the items were retained for convergent validity analysis using Confirmatory Factor Analysis (CFA). CFA was used to evaluate the dimensionality and factorial facet of convergent validity for each construct using Average Variance Extracted (AVE) values. AVE values in excess of .50 indicate a good convergent validity [46] and therefore, all constructs were retained. Table 1 shows the values of Average Variance Extracted (AVE), α, and standardized λs for the constructs measured in our study.

Table 1. Factorial validity and internal consistency of the constructs

Construct	Item code	λ	*α*	AVE
Personal Career goals			.667	.61
	CT01	.753		
	CT04	.735		
	CT03	.722		
	CT02	.682		
Contextual influences			.722	.60
Information and policies	IP04	.756		
	IP03	.71		
	IP02	.682		
	IP06	.556		
	IP05	.543		
Family	FM06	.765		
	FM07	.753		
Self-efficacy expectations			.747	.57
Perseverance	PS03	.772		
	PS02	.739		
	PS01	.652		
Performance	PFF02	.816		
	PFF01	.768		
Emotional state	ES01	.818		

	ES02	.718		
Learning experiences			.634	.50
	VE02	.806		
	VE01	.799		
	VP01	.635		
	ME01	.487		
Background and contextual affordances			.662	.71
Social-economic status	CA02	.798		
	CA03	.740		
	CA01	.517		
Media	CA05	.832		
	CA04	.726		
Outcome expectations			.676	.61
	EB01	.820		
	EB02	.809		
	SB02	.858		
	SB01	.710		
Career decision making			.644	.72
Data structuring/Curation	DS01	.814		
	DS02	.746		
Knowledge base	KB04	.783		
	KB05	.729		
Prediction	PD05	.761		
	PD06	.551		
	PD04	.535		

Source: (Survey data, 2023)

To ensure there are no ethical concerns, the researchers obtained ethical clearance from the Research and Ethics Committee (REC) approved by the Uganda National Council of Science and Technology (UNCST). Moreover, participants' identities were coded for anonymity. Quantitative data preparation and full analysis was conducted in IBM SPSS version 26. Quantitative data was analysed using descriptive statistics to determine respondent profiles' frequencies and percentages, and means (M) and standard deviations (SD). Results were presented in tables.

Qualitative data were thematically analysed using NVIVO with themes and sub-themes identified from factor analysis. Interviewee voices were recorded during the interview and the transcribed text was imported into NVIVO software for qualitative data analysis. Participants' main and similar responses were summarized using themes and subthemes, as per [47]. The qualitative findings were presented through narrative descriptions and direct quotes from participants, which added depth to the quantitative results. Specifically, the qualitative narratives provided context and helped explain the individual experiences behind the quantitative insights.

p-ISSN: **2656-5935** http://journal-isi.org/index.php/isi e-ISSN: **2656-4882**

3. RESULTS AND DISCUSSION

3.1. Descriptive Statistics for the Demographic Variables

Regarding the demographic variables, study districts, age, gender, education level, and respondent classes were analysed. Corresponding descriptive statistics in the form of frequencies and percentages are provided in Table 2.

Table 2. Descriptive statistics for demographic variables

Category	Subcategory	Frequency (N=717)	Percentage (%)
District	Kampala	233	32.5
	Mbarara	158	22.0
	Wakiso	158	22.0
	Kalangala	70	9.8
	Kyegegwa	98	13.7
Region	Central Uganda	461	64.3
	Western Uganda	256	35.7
Age Group	Under 18	68	9.5
	18-24 years	633	88.3
	25-29 years	9	1.3
	Over 29	7	1.0
Gender	Female	372	51.9
	Male	345	48.1
Education Level	Senior Five (secondary)	332	46.3
	Senior Six (secondary)	312	43.5
	First-Year (Degree)	16	2.2
	Second-Year (Degree)	35	4.9
	Third-Year (Degree)	22	3.1
Study Field	Science	347	48.4
	Arts	297	41.4
	Medicine	26	3.6
	Engineering	26	3.6
	Business	21	2.9
School Location	Urban	322	44.9
	Peri-Urban	244	34.0
	Rural	151	21.1

Institution Ownership	Government-Owned	512	71.4
	Private-Owned	205	28.6

From Table 2, most respondents were distributed as follows: – 233 (32.5%), 158 (22.0%), and 158 (22.0%) – were from Kampala, Mbarara, and Wakiso districts respectively. 70 (9.8%) were from Kalangala, and 98 (13.7%) were from Kyegegwa. Central Uganda had 461 (64.3%) respondents, while Western Uganda had 256 (35.7%). The majority of respondents (633; 88.3%) were between 18–24 years old, 68 (9.5%) were under 18, 09 (1.3%) were between 25–29, and 7 (1.0%) were over 29. The majority of respondents were female (372; 51.9%), while a somewhat smaller percentage of them were male (345; 48.1%). In terms of education, most respondents 644 (89.8%) were 'A' level students, while 73 (10.2%) were degree students. 332 (46.3%) of the respondents were senior five students, 312 (43.5%) were senior six students, 35 (4.9%) were second-year students, 22 (3.1%) were third-year students, and 16 (2.2%) were first-year students. Most secondary school students (347, 48.4%) studied sciences, while 297 (41.4%) studied arts. 26 (3.6%) of university students were studying medicine, 26 (3.6%) engineering, and 21 (2.9%) business courses. The descriptive results also show that 322 (44.9%) were from urban schools, 244 (34.0%) from peri-urban schools, and 151 (21.1%) from rural schools. The institution category included 512 (71.4%) government-owned schools and 205 (28.6%) private-owned schools.

3.2. Descriptive Statistics for the Constructs (Variables)

Descriptive results for the seven constructs in our study are provided in Table 3, including quantitative data of mean (M) and standard deviation (SD). Quantitative data and Qualitative data descriptions for each construct follow after the table.

Table 3. Descriptive statistics for the seven study variables.

Items	M	SD
1. Contextual influences		
Some parents/guardians push students towards their career interests and not those of a student (FM06).	3.90	1.274
Students usually abide by their parent's/guardians' career guidance irrespective of its impact (FM07).	3.43	1.192
Information about employment trends is readily available at schools/colleges (IP04)	3.00	1.276
Available career information is always up to date (IP02).	2.96	1.209
Teachers give appropriate guidance to students to enable them to make appropriate career choices (IP03)	3.70	1.178
There is a dedicated office at our institution that guides students about their future careers (IP04).	3.44	1.289

p-ISSN: **2656-5935** http://journal-isi.org/index.php/isi e-ISSN: **2656-4882**

Items	M	SD
School career days are effective sources of career information (IP05).	3.86	1.105
Overall Mean	**3.47**	
2. Learning experiences		
The way I handled career-related decisions worked well for me in the past (VE01).	3.38	1.077
I have role models who are good at making important career decisions (VE02).	3.73	1.175
I share my career ideas with my role models before making my career decision (VE03).	3.34	1.335
Important others have told me that I am good at making career-related decisions (ME01).	3.29	1.238
Overall Mean	**3.43**	
3. Personal Career goals		
I have a clear set of goals for my career after school (CT01).	4.12	1.018
The career goals that I intend to pursue are realistic to attain (CT02).	4.05	.926
The steps I need to take to achieve my career goals are clear (CT03).	3.68	1.066
I know the specific career that I want to take after my graduation (CT04).	4.03	1.002
Overall Mean	**3.97**	
4. Outcome expectations		
The course/subjects I am doing will lead me to a profession that is respected in society (EB01).	4.41	.889
The course/subjects I am doing will lead me to a job with better salary and standards of living (EB02).	4.28	.859
The combination/course I am doing has many job opportunities (SB01).	4.10	.955
I am doing this course to satisfy my parent/guardian or community (SB02)	2.59	1.492
Overall Mean	**3.84**	
5. Self-efficacy expectations		
I can achieve most of the career goals that I set for myself (PS01).	3.94	.924
When I am stuck making a tough career decision, I have to work until it is resolved (PS02).	3.83	.984
I can always manage to solve difficult problems if I try hard enough (PS03)	4.16	.828
I persistently work towards achieving my career goal even when I get frustrated (ES01).	4.13	.894
I try to avoid stressful situations when I am making career choices (ES02).	3.93	1.048

Items	M	SD
I can succeed at almost any endeavour to which I set my mind (PFF01).	4.01	.914
I will succeed in whatever career path I choose (PFF02).	4.02	1.004
Overall Mean	**4.002**	
6. Background and Contextual affordances		
Funders/sponsors influence career decisions a student makes (CA01).	3.54	1.206
Lack of sufficient funding (school fees, materials) negatively affects one's career choices (CA02).	4.32	1.039
Lack of financial and material resources poses a challenge in selecting appropriate subjects (CA03).	3.99	1.137
Access to media (radio, TV, newspapers) is vital for relevant career awareness (CA04).	4.07	.98
I can access various media (radio, TV, newspapers) for career awareness (CA05).	3.80	1.134
Overall Mean	**3.94**	
7. Career Decision making		
Career decision-making process is stressful (PD04).	3.52	1.217
Factors that influence career goals can be predicted (PD05)	3.33	1.068
High unemployment rates are due to wrong career choices made (PD06).	3.27	1.456
I often make decisions based on what others think rather than what I want to do (KB04).	2.12	1.269
When I make a career decision, knowing what my friends think about it is important (KB05).	2.84	1.277
Putting together all information required for a better subject/career choice is complicated (DS01).	3.46	1.087
I have a hard time making important career decisions without help (DS02).	3.4	1.259
Overall mean	**3.13**	

Source: (Survey data, 2023)

Respondents' views on contextual influences of family influences, information and policies vary. A mean score of 3.90 (SD = 1.274) indicates that some parents or guardians actively steer students toward specific career interests. This shows that parental guidance greatly influences students' careers. No matter the influence, students' compliance with parental career guidance had a somewhat lower mean score of 3.43 (SD = 1.192). This suggests that students may consider parental advice but not necessarily follow it if it interferes with their career aspirations. Furthermore, results have demonstrated varied perspectives on educational institution career information. The mean scores of 3.00 (SD = 1.276) and 2.96 (SD = 1.209) show that employment trends are available suggest that while

employment trends are available, they are not always up to date. Respondents also indicated that teachers provide adequate career assistance, with a mean score of 3.70 (SD = 1.178). With a mean score of 3.44 (SD = 1.289), the career guidance office is also perceived positively. Finally, school career days help kids choose careers, with a mean score of 3.86 (SD = 1.105). The grand mean of 3.47 shows reasonable agreement on career guidance and education information availability, with both positive and negative replies. The qualitative findings demonstrate that key informants think that peer pressure, family, friends, and role models affect students' career choices.

Parent (PT): *Yes, family support influences career decisions. Different kids have different talents and parents need to understand their kids. School career counselors can't handle this.* According to TR5, *hanged banners are used to educate students about available careers* as a source of information. However, these banners are expensive to put up and are not durable for future reference.

GT1 added, '*My father supported my concept of doing ICT but my mother wanted me to become a priest but I had to take my own decision. This caused family chaos, so I left home for a week. My mother and I could not talk to each other. . However, my dad was OK.*

GT2 remarked, *'For instance, my 1st born influenced the two brothers to become lawyers'.*
On the other hand, key informant (SD) had this to say about use of ICT for information access: *We can record career talks, create discussion forums, and people can share experiences.*

Learning experiences: Regarding the quantitative learning experience, respondents are moderately confident in their past career-related decision-making, with a mean score of 3.38 (SD = 1.077). Their past career choices seem to have been moderately successful. A mean score of 3.73 (SD = 1.175) suggests that respondents tend to have career-making role models. This indicates that while individuals often admire and seek guidance from successful figures, the extent of this influence varies among them. Mean score for discussing professional ideas with role models before deciding is 3.34 (SD = 1.335), indicating little engagement in seeking advice or validation. The descriptive results also suggest that important others' career decision-making feedback affects self-perception.

External validation or acknowledgment influences decision-making confidence, as the mean score for favorable career decision-making feedback from influential others is 3.29 (SD = 1.238). Moderate agreement across the study's professional decision-making themes is 3.43. This balanced approach to career decisions considers personal experiences, role models, and important people's perspectives. According to TR2, *career mentorship should continue but time is limited. Careers, objectives, and self-discovery are covered during orientation week. On class days, parents and students talk.*

Key informant (TR6) indicated that *every class had careers day. Professionals address students here. Every Wednesday, the careers office gives students career messages at a career assembly and sharing occurs.*

Another graduate key informant (GN) who is a farmer but trained in ICT said, *'I had a friend in Belgium and we used to exchange information by post office; it took 2 months. A café manager wrote to my Belgian friend an email and I got feedback immediately. Two months to seconds. How does it work? The questions kept coming to me. This was my main reason for studying IT.'*

Personal career goals: The descriptive results show that respondents demonstrated clear career goals and a belief in their attainability. A notable finding is the strong sense of clarity and purpose among respondents regarding their career trajectories. The mean score of 4.12 (SD=1.02) implies that the majority of students believe that they will get their career jobs after graduation. It therefore implies that individuals have a well-defined career path in mind and the decision was well thought. However, this is usually not the case as many graduates are unemployed. Participants earned a mean score of 4.05 (SD=.926) in agreement with the fact that the career goals they intend to pursue are realistic to attain. Participants provide specific directions to their goals and believe that these goals should be attainable, while they agree to a less extent on how they should achieve it (mean of 3.68, SD-1.066). The participants will perceive what they are supposed to do and the sequence of the process, but offering more clarification, as well as a thorough plan, will make a career transition easier. The mean score of 4.03 demonstrates that the graduates have a future job in their strategic plans. This indicates the main feature of their character as they are confident and consistently look forward to building a successful career.

Students show having a good environment about the future and putting their minds to the specific career targets, as the grand mean score of 3.97 suggests. It suggests a combination of clear vision, realistic expectations, and a sense of direction in terms of their future professional endeavors.

One graduate key informant (GT1) said, *'You know, a career comes out depending on what your intentions are and what motivates you most. Being an IT person did not start at the university level. I got the interest of becoming an IT person when I was actually in senior 3.'* His statement also signifies that people believe that there is a possibility of achieving their career goals.

Additionally, GT2 said, *From O'level, I had three lines I was dreaming about. I wanted to be a lawyer, a journalist or a banker. As I proceeded to Advanced-level, I forgot about journalism and I was still thinking about law. However, my UNEB (national assessment) Advanced-level score dictated that I could not go for law. I applied to do a diploma in law at LDC but I didn't qualify as well. So, I ended up going to Uganda College of Commerce for a diploma in business*

studies to become an accountant. Currently, I have a master's degree and a good job. But it was a struggle.

This indicates that students always have career goals but the road to achieving them is not always straight forward.

Self-efficacy expectations: Strong self-efficacy beliefs are evident in respondents. The mean scores indicate that the majority of participants believe they can achieve most of the career goals they set for themselves (M=3.94, SD=.924) and are persistent in working towards these goals even when faced with challenges or frustration (M=4.13, SD=.894). This indicates resilience and dedication to professional success. Furthermore, participants also believed they could solve tough tasks with enough effort, with a mean score of 4.16. Their ability to overcome such obstacles shows a constructive outlook on work-related challenges. From personal experience, they believe in positive thinking and tenacity when setting professional goals. Participants also tend to avoid unpleasant situations while choosing careers (M=3.93, SD=1.048). Shorter choices may be chosen for more efficient career decision-making, reducing stress and worry. The participants' mean scores of 4.01 (SD=.914) and 4.02 (SD=1.004) for the statements about excelling in various pursuits and being confident in class showed a considerable improvement in confidence in their skills to excel in their intended professional pathways. Based on a mean score of 4.002, it clearly shows students' self-confidence, resilience, analytical ability, and sense of achievement in overcoming obstacles and achieving career goals.

Outcome expectations: The study examines how participants' fields of study affect their perceptions of social distinction, prosperity, employment chances, and social expectations from parents and the community. Participants applied to their programs with high optimism and positive attitudes about their majors. However, there is a lower level of agreement regarding whether participants are pursuing their course solely to satisfy their parents/guardians or community expectations (M=2.59, SD=1.492). External factors may provide some input, but personal factors like goals and motivation are of great importance in determining one's education pathway.

The qualitative findings and quantitative results are in agreement, confirming key informants' statement (GT1) that *'I think I will attain a profession which is highly respected in the society after I finish my course'.*

Background and contextual affordances: The study also examined how funders/sponsors, financial issues, media accessibility, and resource availability affect students' career awareness. The subjects' average score of 3.54 revealed slight

agreement that sponsorship/funders affected their career choices. Public sponsorships may hamper career selection, but they may not be the main culprit. Participants are also generally aware that lack of funds results from such deficiency (M=4.32, SD=1.039). This shows that a significant proportion of accomplishments have been achieved despite financial hardship. Money and resource shortages also hampered topic selection (M=3.99, SD=1.137). Thus, resource availability may greatly influence educational and career paths.
Moreover, student career awareness was most often discovered through radio, TV, and newspapers (M=4.07, SD=.98). Participants understand that media spreads information and reveals careers. In the questionnaire, people understood career awareness's media influence but struggled to characterize their media access (M=3.8, SD=1.134). Media matters, yet individuals' career skills may vary.
The grand mean is 3.944, which indicates that many respondents saw funding, financial limitations, and media availability as positively affecting their career choices and knowledge.

Accordingly, one key informant (GT2) stated the following: '*After one semester, money is gone. Islamic University in Uganda accepted me for a degree but I had no money. Thus, I pursued a diploma and completed it on time.'*

Career decision-making: Among the questions that measured career decision-making, a key finding is the moderate level of agreement among respondents regarding the stressful nature of the process (M=3.52, SD=1.217). This shows that individuals find job decision-making difficult and anxiety-inducing. Participants also had conflicting opinions on career goal prediction (M=3.33, SD=1.068). This suggests that students' perceptions of career aspiration vary. Interestingly, less agreement was found about the statement that high unemployment rates are mainly related to bad profession choices (M=3.27, SD=1.456). This suggests participants consider factors other than near-term job choices when choosing employment rates. Moreover, this category includes participants who solely share their thoughts using "group think" (M=2.12, SD=1.269), which partially clarifies how social factors and friends' judgments affect professional choices. Participants also cited peer impact on professional choices. A consolidated mean score of 2.84 (SD=1.277) indicates moderate participant agreement. Thus, peers' evaluations may impact profession choice, but not alone.

Participants expressed difficulty learning the required knowledge for their field of study or career (M=3.46, SD=1.087). This shows that collecting data that is going to be used for decision-making is time-consuming. Moreover, participants tend to consider major professional decisions as difficult without support (M=3.4, SD=1.259). This finding underscores the importance of external guidance in complex professional decision-making. Participants' perceptions and experiences of career decision-making stress, predictability, peer perspectives, and hurdles vary,

as the mean is 3.13. This emphasizes the complexity of decision-making and the intricate effect of various factors that influence career paths.

Key informant (TR3) said, *'Some schools urge students to do subjects where they can score well and make the school shine. This happens in government and private schools'.*
About the complexity in career decision making, key respondent (TR5) had this to say: *Yes, all the constructs (SCCT constructs) have good information but it is complicated to harmonise it and ICT can be helpful in this.*

3.3. Discussion

The purpose of our study was to identify requirements for a technology-supported career selection model. SCCT variables were used to derive the requirements and the study findings reveal that all the seven variables affect career decision-making. More specifically, study findings suggest that contextual variables like family, friends and role models shape the career choices of students. The findings also revealed that mentors from various fields challenge and motivate students, providing career role modelling. The research also suggests strong-willed, self-starting role models inspire students to work hard and succeed in their careers. Parental income, education, and culture also make an impact on student careers. Moreover, social status, resource constraints, everyday norms, and family were found to affect students' careers and possibilities. The study resonates with the findings by [47] and [48], who reveal that contextual influences are a key requirement for career choice making. Our findings also support previous arguments by [49] who suggested that equitable access to career-related information by use of digital platforms for virtual mentorship, peer support, and networking, can help enhance the associations of students with professional people to reduce geographical and socio-economic barriers that may hinder students from accessing supporting role models to shape their career choice. Studies by [50] contend that technology-enhanced career selection model provides students with equal opportunities for career exploration and development hence enhancing career development. Our findings further confirm that learning expectations shape career decision-making.

Moreover, our findings suggest that learning experiences such as vicarious learning, verbal persuasion, and mastery experience affect students' careers. They support the works of [51] and [52], who found that learning takes place through various opportunities such as internships and volunteer work which enhances career readiness. The findings also support the argument by scholars such as [53] who advocate for peer mentorship and family engagement by enabling virtual engagements such as online workshops, career simulation games, and digital internships and success stories.

p-ISSN: **2656-5935** http://journal-isi.org/index.php/isi e-ISSN: **2656-4882**

The findings of our study further reveal that personal career goals shape students' career choices. The findings illustrate that students pick careers that blend with their goals. The results demonstrate that career success requires goal-setting. According to our findings, students with defined career goals are more likely to explore job possibilities and succeed. Students develop goals, practice coping skills, and match skills to assignments in career advancement models. Therefore, our findings corroborate [43], who found that goal-setting aligns career choice with personal values and interests. Our findings also support the arguments by [54] that digital platforms equipped with interactive planning tools aid students in identifying careers that resonate with their personal values and setting realistic goals. Furthermore, our study also confirmed that outcome expectations shape career choice. Moreover, our findings suggest that including knowledge about job rewards, recognition and the happiness brought by certain professions should be prioritized for career choices. This corroborates the findings of [43], [47], [55], who stated that predicting one's future is a key factor for making a wise choice in their career.

Furthermore, our findings support the works of [56], who argue that online forums and mentorship initiatives offering interaction between students and professionals provide valuable insights into career outcomes. These interactions enrich students' understanding of potential career paths by helping them assess job markets and shape their career aspirations. Additionally, our findings are in line with the claims of [57] who assert that observing the market and understanding the opportunities improves outcome expectations, resulting in appropriate occupational choice. According to these scholars, adding indicators of success and industry trends enhances career decision-making. Our findings also reveal that self-efficacy expectations are key in shaping one's career choice. The results suggest that enhancing the self-efficacy of students through digital methods such as job shadowing and mentoring boosts students' confidence in their ability to make the right career choice. Therefore, our results have similar implications to those of [54] and [56]. They reported that the online mentoring programs and the student peer support networks are the platforms students make good use of by sharing their experiences which in turn improves their career self-awareness.

Therefore, the value of our findings is in the implications for career counselling. According to our findings, which are in line with SCCT framework, it is possible to leverage digital platforms and technology-enhanced models to support students in their career decision-making processes. Specifically, counsellors can incorporate strategies to foster self-efficacy, goal-setting, and outcome expectations by providing access to virtual mentorship, career exploration tools, and peer networks. These strategies can be made more efficient by using real-time data on students during the counselling sessions. Beyond identifying what to foster in students, digital platforms also offer counsellors real-time data on market trends.

This empowers counsellors to provide more precise and timely advice. Moreover, integrating AI, machine learning, and data analytics could enable counsellors to offer personalized insights, predict career outcomes, and present students with personalized recommendations based on individual preferences and market conditions. By combining strategies to foster essential constructs in combination with data-driven insights, career counselling can become more efficient. Thus, our study underscores the importance of a holistic, technology-supported framework for career counselling that addresses contextual factors, personal aspirations, and the evolving needs of students in today's dynamic job market.

Consequently, the value of our approach is that it also offers several advantages over traditional career selection models. While earlier models like Merton's theory [30], the Anchor model [31], and Holland's career interest types [32] have been criticized for their theoretical limitations and lack of practical outcomes, our approach incorporates modern technological advancements to address these gaps. Traditional models are often considered overly cognitive and fail to fully account for the broad range of factors influencing career choices. In contrast, not only is our study based on a wider range of constructs within the SCCT framework, but it also leverages AI, machine learning, and data analytics [34], [35], [36] to provide a more comprehensive and personalized career selection framework. This allows a more dynamic and adaptable system that can accommodate diverse career fields and evolving market trends. By embedding these technologies, our approach not only addresses the theoretical and pragmatic limitations of earlier models but also enhances career decision-making with a more holistic, technology-supported, and future-oriented methodology.

These traditional models have been used in current career-guidance practices. A recent critical review [58] found that there is a wide range of different approaches to career guidance, but these approaches are generally poorly theorized and evidenced. In the Ugandan context [58], there was an effort to invest in career guidance and counseling at all educational levels through infrastructure development, human resource, publication and distribution of career guidance materials, and monitoring and evaluation of career guidance and counselling activities in the country. However, there are challenges in human resources, training materials, and lack of standardized assessment tools. Additionally, [48] have found that Ugandan students are aware of the availability of career counselling services, but such services are typically ineffective due to issues such as poor attitude and lack of cooperation from students, low capacity among teachers and school administrators, lack of parental involvement, and lack of policy support. Thus, a technology-enhanced approach to career counselling, as outlined in our study, could offer a solution for under-resourced schools, such as those in Uganda. In such contexts, digital platforms can provide scalable, cost-effective

solutions only if the factors and requirements that form a basis of their development are clearly understood.

4. CONCLUSION

According to social cognitive theory, our study identifies key requirements for a technology-supported career selection model for secondary school students based on empirical findings. The findings underscore the importance of prior academic achievement and self-efficacy beliefs, goal setting, outcome expectations, and successful career decision-making in student career development. The study suggests that educational institutions can take a more proactive role in providing career counselling services aligned to each student's abilities, interests, and values. This approach expands the range of appealing career options for students.

Our findings further demonstrate the role of peer mentoring and parents/family in career decision-making. Peer and family groups are able to provide additional support and guidance which can help students in filling the gaps in their professional development. By offering personalized career guidance, educational institutions can ensure that all students are given equal opportunity to achieve their career goals. As our and some previous findings suggest, school managers could consider online platforms that facilitate workshop sessions, internships, and mentorships that give students a chance to explore available career options and improve their career understanding. Through collaboration with local companies, community organizations and alumni networks, students can acquire practical experience that will help them in navigating their career. Integrating technology into career guidance further enhances this process, enabling individualized learning and more effective career support.

The broader implications of this approach suggest that integrating technology into career counselling can not only improve decision-making processes but also democratize access to career guidance, particularly in underserved regions. In the long term, basing on the identified requirements, a technology-supported career selection model in developing countries could promote equitable access to opportunities and align students' career choices with market demands, driving sustainable economic growth. Future research should explore how emerging technologies like AI-driven career simulations and virtual reality can utilise the identified requirements to further enhance the effectiveness of career counselling interventions.

REFERENCES

[1] Uganda National Curriculum Development Centre, Lower Secondary Curriculum Framework, *NCDC*, Kampala, Uganda, 2019.

[2] S. Guraya, "Combating the COVID-19 outbreak with a technology-driven e-flipped classroom model of educational transformation," in *Journal of Taibah University Medical Sciences*, vol. 15, no. 4, p. 253, 2020.
[3] National Research Council, Division of Behavioral and Social Sciences and Education, Committee on Enhancing Professional Development for Teachers, *Enhancing Professional Development for Teachers: Potential Uses of Information Technology: Report of a Workshop,* National Academies Press, 2007.
[4] B. Karnewar, S. Purankar, S. Jagtap, P. Borkar, and D. Shirbhate, "A Comprehensive Review of Career Guidance System: Challenges and Innovation in Digital Career Guidance Systems," 2023.
[5] M. J. M. Karp, Entering a Program: Helping Students Make Academic and Career Decisions, 2013.
[6] N. C. Gysbers and P. Henderson, Developing and Managing Your School Guidance and Counseling Program, John Wiley & Sons, 2014.
[7] M. L. Savickas et al., "Life designing: A paradigm for career construction in the 21st century," in *Journal of Vocational Behaviour*, vol. 75, no. 3, pp. 239–250, 2009.
[8] Uganda Bureau of Statistics, "Statistical Abstract," UBOS, Kampala, Uganda, 2020.
[9] M. K. Tuhame, G. Maiga, A. Habinka, and B. Kayondo, "Towards a Conceptual Model for Developing a Career Prediction System for Students' Subject Selection at Secondary School Level," in *Proceedings of African Conference of Information Systems and Technology*, 2022.
[10] A. Mann and J. Dawkins, Employer Engagement in Education: Literature Review, ERIC, 2014.
[11] J. A. Marriott, What is Online Research?, Bloomsbury Academic, 2012.
[12] P. L. Curşeu, J. H. Semeijn, and I. Nikolova, "Career challenges in smart cities: A sociotechnical systems view on sustainable careers," in *Human Relations*, vol. 74, no. 5, pp. 656–677, 2021.
[13] J. Bimrose, J. Kettunen, and T. Goddard, "ICT–the new frontier? Pushing the boundaries of careers practice," in *British Journal of Guidance Counseling*, vol. 43, no. 1, pp. 8–23, 2015.
[14] A. Banerjee, "Text and voice-enabled chatbot enhancing the user experience in career counselling domain," Dublin Business School, 2019.
[15] R. W. Lent, S. D. Brown, and G. Hackett, "Toward a unifying social cognitive theory of career and academic interest, choice, and performance," Journal of Vocational Behavior, vol. 45, no. 1, pp. 79-122, 1994.
[16] D. Wang, X. Liu, and H. Deng, "The perspectives of social cognitive career theory approach in current times," *Frontiers in Psychology*, vol. 13, p. 1023994, 2022.
[17] R. W. Lent and S. D. Brown, "Social cognitive career theory at 25: Empirical status of the interest, choice, and performance models," in *Journal of Vocational Behaviour*, vol. 115, p. 103316, 2019.

[18] D. Jackson, "Employability skill development in work-integrated learning: Barriers and best practice," in *Studies in Higher Education*, vol. 40, no. 2, pp. 350–367, 2015.
[19] M. Fisher and D. E. Baird, "Making mLearning work: Utilizing mobile technology for active exploration, collaboration, assessment, and reflection in higher education," in *Journal of Educational Technology Systems*, vol. 35, no. 1, pp. 3–30, 2006.
[20] S. Thomas, Future Ready Learning: Reimagining the Role of Technology in Education. 2016 National Education Technology Plan, Office of Educational Technology, U.S. Department of Education, 2016.
[21] P. Aithal and S. Aithal, "Stakeholders' Analysis of the Effect of Ubiquitous Education Technologies on Higher Education," in *International Journal of Applied Engineering and Management Letters (IJAEML)*, vol. 7, no. 2, pp. 102–133, 2023.
[22] L. L. Bierema and S. B. Merriam, "E-mentoring: Using computer-mediated communication to enhance the mentoring process," in *Innovative Higher Education*, vol. 26, pp. 211–227, 2002.
[23] F. Mikre, "The roles of information communication technologies in education: Review article with emphasis to the computer and internet," in *Ethiopian Journal of Education and Sciences*, vol. 6, no. 2, pp. 109–126, 2011.
[24] A. Bandura, *Social Foundations of Thought and Action*, Englewood Cliffs, NJ: Prentice-Hall, 1986.
[25] R. Talavera-Franco, Exploring the Learning Experiences of Adult Hispanics in MOOCs through Self-Efficacy Theory, Northeastern University, 2018.
[26] M. Akinlolu, T. Omotayo, O. J. Ebohon, and D. Ekundayo, "An Analysis of the Mediational Effect of Socio-Cultural Factors on Student's Career Choice Outcomes in the Built Environment: Applying the Socio-Cognitive Career Theory," in *Education Sciences*, vol. 13, No. 10, p. 1035, 2023.
[27] J. P. Makela, Career Counseling as an Environmental Support: Exploring Influences on Career Choice, Career Decision-Making Self-Efficacy, and Career Barriers, University of Illinois at Urbana-Champaign, 2011.
[28] G. Segal, D. Borgia, and J. Schoenfeld, "Using social cognitive career theory to predict self-employment goals," in *New England Journal of Entrepreneurship*, vol. 5, no. 2, pp. 47–56, 2002.
[29] Gati, I., Levin, N., & Landman-Tal, S., Decision-making models and career guidance. In W. B. Walsh & M. J. Savickas (Eds.), International handbook of career guidance, pp. 115-145, 2019. Springer.
[30] L. Mocrei-Rebrean, "Values and Career Choice-Revisiting Robert Merton's Reference Group Theory," *International Journal of Social & Educational Innovation*, vol. 9, no. 18, p. 30, 2022.
[31] T. Wils, L. Wils, and M. Tremblay, "Revisiting the career anchor model: A proposition and an empirical investigation of a new model of career value structure," *Relations industrielles*, vol. 69, no. 4, pp. 813-838, 2014.

[32] L. F. Zhang, "Revisiting the big six and the big five among Hong Kong university students," *Educational Psychology*, vol. 28, no. 1, pp. 1-14, 2008.
[33] F. Haneef, R. A. Abbasi, M. N. Noor, A. Daud, and M. A. Sindhu, "A review of career selection models," *Researchpedia Journal of Computing*, vol. 1, no. 1, pp. 30-38, 2020.
[34] T. Mehraj and A. M. Baba, "Scrutinizing artificial intelligence-based career guidance and counselling systems: an appraisal," *International Journal of Interdisciplinary Research and Innovations*, vol. 7, no. 1, pp. 402-411, 2019.
[35] S. S. Pandya and J. Wang, "Artificial intelligence in career development: a scoping review," *Human Resource Development International*, vol. 27, no. 3, pp. 324-344, 2024.
[36] M. Nie, Z. Xiong, R. Zhong, W. Deng, and G. Yang, "Career choice prediction based on campus big data—mining the potential behavior of college students," *Applied Sciences*, vol. 10, no. 8, p. 2841, 2020.
[37] M. D. Fetters, L. A. Curry, and J. W. Creswell, "Achieving integration in mixed methods designs—principles and practices," in *Health Services Research*, vol. 48, no. 6pt2, pp. 2134–2156, 2013.
[38] J. Creswell, *Research Design*, 4th ed., SAGE Publications Inc., 2014.
[39] R. M. Groves and E. Peytcheva, "The impact of nonresponse rates on nonresponse bias: a meta-analysis," *Public Opinion Quarterly*, vol. 72, no. 2, pp. 167-189, 2008.
[40] R. D. Duffy and T. L. Raque-Bogdan, "The motivation to serve others: Exploring relations to career development," *Journal of Career Assessment*, vol. 18, no. 3, pp. 250-265, 2010.
[41] R. W. Lent, S. D. Brown, and G. Hackett, "Social cognitive career theory," in *Career Choice and Development*, vol. 4, no. 1, pp. 255–311, 2002.
[42] P. Tierney and S. M. Farmer, "Creative self-efficacy: Its potential antecedents and relationship to creative performance," *Academy of Management Journal*, vol. 45, no. 6, pp. 1137-1148, 2002.
[43] M. Coetzee, "Students' Career Capital Resource Needs for Employability in the Technology-Driven Work World," in *Journal of Teaching and Learning for Graduate Employability*, vol. 14, no. 1, pp. 136–150, 2023.
[44] J. C. Nunnally and I. H. Bernstein, *Psychometric Theory*, 3rd ed. New York: McGraw-Hill, 1994.
[45] T. A. Brown, "Confirmatory factor analysis for applied research," Guilford Publications, 2015.
[46] J. F. Hair, W. C. Black, B. J. Babin, and R. E. Anderson, Multivariate Data Analysis, 7th ed., Prentice Hall, 2010.
[47] J. Xu, S. She, and W. Liu, "Role of digitalisation in the environment, social and governance, and sustainability: Review-based study for implications," in *Frontiers in Psychology*, vol. 13, p. 961057, 2022.

[48] A. T. Otwine, L. Matagi, J. M. Kiweewa, and H. E. Ainamaani, "Efficacy of career guidance and counselling among secondary schools in Uganda," in *African Journal of Career Development*, vol. 4, no. 1, p. 8, 2022.

[49] R. J. Giraldo-García, M. Roy, and C. Hansman, "Leveraging Minority Students' Social Capital and Employment Opportunities: Mentorship and Technology," in *Journal of Advanced Research in English and Education*, vol. 4, no. 3, pp. 2–12, 2019.

[50] National Research Council, Division of Behavioral and Social Sciences and Education, Board on Science Education, Successful K-12 STEM Education: *Identifying Effective Approaches in Science, Technology, Engineering, and Mathematics*, National Academies Press, 2011.

[51] A. Detgen, F. Fernandez, A. McMahon, L. Johnson, and C. R. Dailey, "Efficacy of a college and career readiness program: Bridge to employment," in *The Career Development Quarterly*, vol. 69, no. 3, pp. 231–247, 2021.

[52] M. Chavan and L. Carter, "Management students–expectations and perceptions on work readiness," in *International Journal of Educational Management*, vol. 32, no. 5, pp. 825–850, 2018.

[53] C. Dede, A. Eisenkraft, K. Frumin, and A. Hartley, Teacher Learning in the Digital Age: Online Professional Development in STEM Education, *Harvard Education Press*, 2016.

[54] I. Linde, E. Sarva, and L. Daniela, "The Impact of an Online Professional Development Course on Teachers' Comprehension and Self-Efficacy in Developing Students' Self-Regulated Learning Skills," in *Sustainability*, vol. 15, no. 12, p. 9408, 2023.

[55] V. Smirnova and S. Lukianchuk, "Innovative Career Guidance as a Solution to Russian Unemployment," Thesis, 2023.

[56] V. R. Whiting and S. C. de Janasz, "Mentoring in the 21st century: Using the Internet to build skills and networks," in *Journal of Management Education*, vol. 28, no. 3, pp. 275–293, 2004.

[57] A. E. Bowers, "Life After Graduation: Exploring the Utility of a College and Career Research Project in Defining Students' Post-High School Goals," *University of South Carolina*, 2017.

[58] T. Hooley and S. Rice, "Ensuring quality in career guidance: A critical review," *British Journal of Guidance & Counselling*, vol. 47, no. 4, pp. 472-486, 2019.

[59] O. Anne, O. Joseph, J. M. Kiweewa, and S. Nsamba, "Career guidance and counselling in Uganda, current developments and challenges," *International Journal of Innovative Research and Development*, vol. 7, no. 11, 2018.