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## Influencing adolescent's career choices: parent's perceptions of information systems

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### Abstract

The demand for professionals in Information Systems and those with related skills continues to increase. Training a qualified workforce to meet this demand and raising awareness of the field of IS remains a challenge. Initiatives such as virtual scavenger hunts, hack-a-thon challenges, and technology camps aim to help adolescents gain a better understanding of themselves and their career interests, recognize how education prepares them for future professions, and ultimately increase the number of those interested in STEM-related fields (science, technology, engineering, and math). Career development theories explain how career choices are made and highlight the importance of parents' influence on their child's career decisions. The purpose of the research paper is to explore parental perceptions of middle school children's career aspirations and answer the research question, "How do parents perceive Information Systems as a career choice for their child?" Answering this question may reveal how to more effectively market Information Systems and related fields to increase the number of skilled professionals and meet labor market demands as well as contribute to theories of career decision-making.

**Keywords:** Information systems, career development, middle school, parent perceptions.

### Introduction

The need for professionals in Information Systems (IS) has never been greater. The US Bureau of Labor Statistics projects occupations related to IS to grow much faster than other occupations, adding nearly 667,600 new jobs by 2030 as a result of a greater emphasis on cloud computing, the collection and storage of big data, and information security (Computer and Information Technology Occupations, 2022). The demand for IS professionals in the field continues to increase, and many companies are still looking for qualified workers.

Currently, 7% of total U.S. employment is at high risk of being automated in the next few years (Pearlson et al., 2019). The automation of these jobs will require different knowledge, skills, and training opportunities of the upcoming workforce. In a recent McKinsey Global Survey, almost nine in ten executives and managers stated their organizations currently face skill gaps related to data analytics, IT management, and executive management, or expect these gaps to develop within the next five years (How Companies Are Reskilling to Address Skill Gaps | McKinsey, 2020).

Previous studies show children who choose to pursue professions in science, technology, engineering, and math (STEM) describe three critical aspirational reasons for doing so: (1) a growing interest related to the occupations (Maltese & Tai, 2011), (2) family interest in the occupations (Dabney, Chakraverty, & Tai, 2013), and (3) the quality of parents' conversations regarding these occupations (Hyde et al., 2016; Shillingford et al., 2017).

Research by Rozek, Svoboda, Harackiewicz, Hulleman, and Hyde (2017) suggests that parents can play a significant role in supporting their children's interest in and career pursuit of STEM professions (Shillingford et al., 2017). Parents have a strong influence on their children's occupational choices. The impact may be the result of several factors, including a child's perceived support from a parent in an occupational decision (Ginevra et al., 2015), the occupation of a child's parent (William, 2016; Munyingi, 2012; Kisulu, Kimani & Kombo 2012), and parents shaping their children's motivational beliefs (Maloney, Converse, Gibbs, Levine, & Beilock, 2015).

Career development during middle school (grades 6-8) helps children develop a knowledge of occupations and raise awareness of their interests, abilities, values, and aptitudes. Much research has been done on understanding what influences adolescents' career choices (Gottfredson, 2002; Holland, 1997; Lent et al., 2000; Marcia, 1966; D. E. Super, 1980). What still needs to be understood is how a parent's perceptions and evaluation of career choices can influence an adolescent during the middle school years. This research paper aims to explore parental perceptions of middle school-aged children's career aspirations and answer the research question, "How do parents perceive Information Systems as a career choice for their child?" Answering this question may increase understanding of parents' awareness of Information Systems, expound parental influence on career decisions, offer additional insight into career development theories, and reveal how to more effectively market Information Systems and related fields to increase the number of skilled professionals and meet labor market demands.

## Literature Review

Middle school (grades 6-8) is a time of self and career-exploration. Educators of children in intermediate grades use the National Career Clusters Framework (NCCF) to help them discover their interests and begin exploring classes to assist them in choosing an educational pathway. Career clusters are a group of occupations with similar characteristics. Research shows that utilizing the NCCF may lead to success in high school, college, and a future career (Career Clusters | Advance CTE, 2022). The NCCF also represents 79 career pathways in the following 16 nationally recognized clusters which can help students understand how to enter careers relating to their interests:

- Agriculture, Food & Natural Resources
- Architecture & Construction
- Arts, A/V Technology & Communications
- Business Management & Administration
- Education & Training
- Finance
- Government & Public Administration
- Health Science
- Hospitality & Tourism
- Human Services
- Information Technology

- Law, Public Safety, Corrections & Security
- Manufacturing
- Marketing
- Science, Technology, Engineering & Mathematics
- Transportation, Distribution & Logistics

Skills relating to IS are evident in each of the above career clusters. The IS discipline links the rapidly changing technology landscape with the technological transformation of individual, organizational, and societal practices (Topi, 2017). The skills required for IS professionals permeate almost every career cluster. Because of this, the demand for prepared graduates in IS continues to multiply. Career exploration in intermediate grades is a vital time to increase adolescents' awareness of careers that are likely to have a shortage of skilled workers or expect to experience a lack of qualified workers (DeWitt, 2018).

The Dakota Dreams Career Exploration Summer Camp is one example of a program funded by the American Rescue Plan Act. The purpose of career development in middle school is not to have adolescents choose one career, which has become increasingly complex with the ever-changing job market, but instead to help them prepare for future careers by exploring different occupations and their interests, aptitudes, and values. The American Rescue Plan Act of 2021 was passed to help those impacted by the COVID-19 pandemic, which includes small businesses struggling to hire and retain qualified workers (U.S.C., 2021). Educational entities can use funds from this act to assist in training and educational programs to support businesses and industries. The Dakota Dreams Career Exploration Summer Camp provides adolescents in grades 7 and 8 opportunities for career and self-exploration by participating in a week-long series of classes and hands-on activities in the following seven career clusters: Agriculture, Food & Natural Resources; Business Management & Administration; Information Technology; Science, Technology, Engineering & Mathematics; Arts, Audio/Video Technology & Communications; Health Science; and Education & Training.

The exploration of self and careers is a vital step in the career development process of middle school adolescents. James Garcia's Theory of Identity Development (1966), states adolescents in moratorium actively explore possibilities but do not make any commitments. Adolescents in sixth and seventh grade begin to question who they are and how they see themselves in the world of work, and actively explore different career options, without committing to one career.

Foundational career development theories focus on helping adolescents become aware of their interests and abilities and how they are related to work opportunities (Holland, 1997; D. E. Super, 1980), as well as internal characteristics such as values (Brown, 2002) and self-efficacy (Bandura, 1997) to guide them in the career decision-making process. According to Holland's theory, if a person and an environment are the same or similar, there will be congruence or occupational fit, and the person will likely be satisfied and persist in that environment. This satisfaction will result from individuals being able to express their personalities in supportive environments that include other persons who have the same or similar personality traits (Holland, 1997). Holland's Theory of Vocational Choice (1997) further suggests that for an occupational choice to be appropriate, the individual must have accurate occupational knowledge, accurate self-knowledge, and accurate self-evaluation.

Occupational knowledge is "the accuracy one has in understanding information related to careers" (Schmitt-Wilson & Welsh, 2012). If information about a career is unknown or inaccurate, incorrect perceptions may occur. Accurate knowledge of an occupation, including educational and vocational training requirements, is essential to developing realistic and congruent educational and occupational aspirations (Theresa, 2015).

Self-concept is the sum of people's beliefs about themselves, including their personality, interests, and perceived place in society (Gottfredson, 1981). According to Gottfredson's Theory of Circumscription of Compromise (2002), occupational aspirations reflect one's self-concept. People seek occupations that (a) are congruent with their self-image and (b) reflect their knowledge of different occupations. People will often disregard occupations they perceive to be beyond their capabilities, however appealing that occupation may be, which is why perceived self-efficacy is a crucial factor in career choice and development (A. Bandura, Barbaranelli, Caprara, & Pastorelli, 2001). Therefore, perceptions of a career may lead one to draw conclusions on which line of work they are best suited for or cause them to rule out possible careers in which they are only vaguely aware (Gottfredson, 2002).

The Social Cognitive Career Theory (Lent et al., 2000) is a more recent theory that integrates elements of previous career theorists, such as Super (1957) and Holland (1997). It explains how people develop vocational interests, makes occupational choices, and achieve varying levels of career success. The theory incorporates interests, abilities, values, and environmental factors that affect career development but suggests career choices can be more directly influenced by self-efficacy beliefs, outcome expectations, or environmental variables than by interests alone. For example, an adolescent may be interested in a particular line of work but may not be able to pursue these interests due to family pressures or educational limitations. Cultural values, or the degree to which elder family members may guide one's choices, may also limit the role of personal interests in career choice (Lent et al., 2000).

Ecological theories are becoming more popular in recent years as these theories focus on understanding the importance of adolescents' environments in career development. Bronfenbrenner's Bioecological Theory (Bronfenbrenner, 1974) is one such theory that explains how the systems within which children exist can influence how they grow and develop. This theory states that the parent-child relationship is the most prominent influence on a child and can significantly influence development processes. Some of the other critical points of this theory include the following:

1. Children's biology is the most crucial determinant of their development
2. Environments interact to shape children's growth and maturation
3. Interactions become more complex as children develop and
4. Relationships that exist within a microsystem are most influential to children

Environmental influences have an impact on career decisions. A recent study found that as many as 65% of those just entering the workforce enter the field their parents wanted for them (Perna, 2021). The same study looked at the different influences of parents and found around 58% of parents influenced their children by talking about the importance of the career they preferred, 53% discussed the benefits for the family as a whole, and 37% were influenced by their parent's passion for their own career.

Encouraging the development of skills relating to developing, managing, maintaining, and using Information Systems is a requirement for developing a qualified workforce and is essential for meeting labor market demands. Thus, this study will explore how parents perceive Information Systems as a career choice for their children.

## Research Methodology

This study employs qualitative methods to explore the research question, "How do parents perceive Information Systems as a career choice for their child?" Qualitative methods provide researchers with the

ability to discover relations from data that is systematically gathered and analyzed (Kaplan & Duchon, 1988).

The data collection site was the Dakota Dreams summer camp program, which is funded by a three-year grant awarded to the South Dakota Board of Regents (BOR) from the South Dakota Department of Education (DOE) in February 2022. This grant provides rising 7th and 8th graders week-long, residential summer camps hosted on university campuses with day trips to area technical colleges during the summers of 2022, 2023 and 2024. Camps are designed to help students explore career options and how they relate to educational choices in middle school, high school and college. In 2022, the following logic was applied when selecting campers:

1. Camp preference
2. High priority school district by need (as determined by school districts labeled Title I and/or Excessive Absenteeism during COVID)
3. Student grade level in Fall 2023
4. Date of application

Applicants were first sorted by their #1 camp preference. Then they were sorted by high priority school districts and grade level. All rising 8th graders in the high priority districts were admitted into the summer 2023 camps. Once those students were accepted, the remaining camp spots were filled with rising 7th graders from high priority districts. The date of application was used to prioritize these 7th graders. When there were additional camp spots remaining beyond those in high priority districts, rising 8th graders from non-priority districts were accepted. Their date of application was used to determine priority.

Surveys with open-ended questions were the primary data collection. Open coding techniques (Corbin & Strauss, 1990) were utilized for data analysis. Open coding enabled the interpretation of the data to develop categories to group the data. Axial coding facilitated the identification of relationships between the categories. To unify the categories around a core category, selective coding was implemented. The target population for this study was parents who enrolled their adolescents in the Dakota Dreams Career Exploration Summer Camp.

### Data Collection

After obtaining an IRB, the researchers provided a paper survey to parents registering their child at the Dakota Dreams Career Exploration Summer Camp on August 15, 2022. The researchers asked the following questions on the survey:

- Q1. What job or career does your child want when they grow up? Why?*
- Q2. What job or career do you feel would be a good fit for your child when they grow up? Why?*
- Q3. Do you feel your child may be interested in a job or a career in Information Systems? Why or why not?*

Although the survey was optional, forty-six of the forty-nine parents registering their child completed the survey for an approximately 94% response rate. There were no incentives offered for parents to complete the survey. Of the forty-six parents who completed the survey, most had children ages 12 or 13 (84.8%), and gender was evenly split (Male 50%, Female 48%, No Answer 2%) as shown in Table 1 and Table 2.

**Table 1: Demographics by Age**

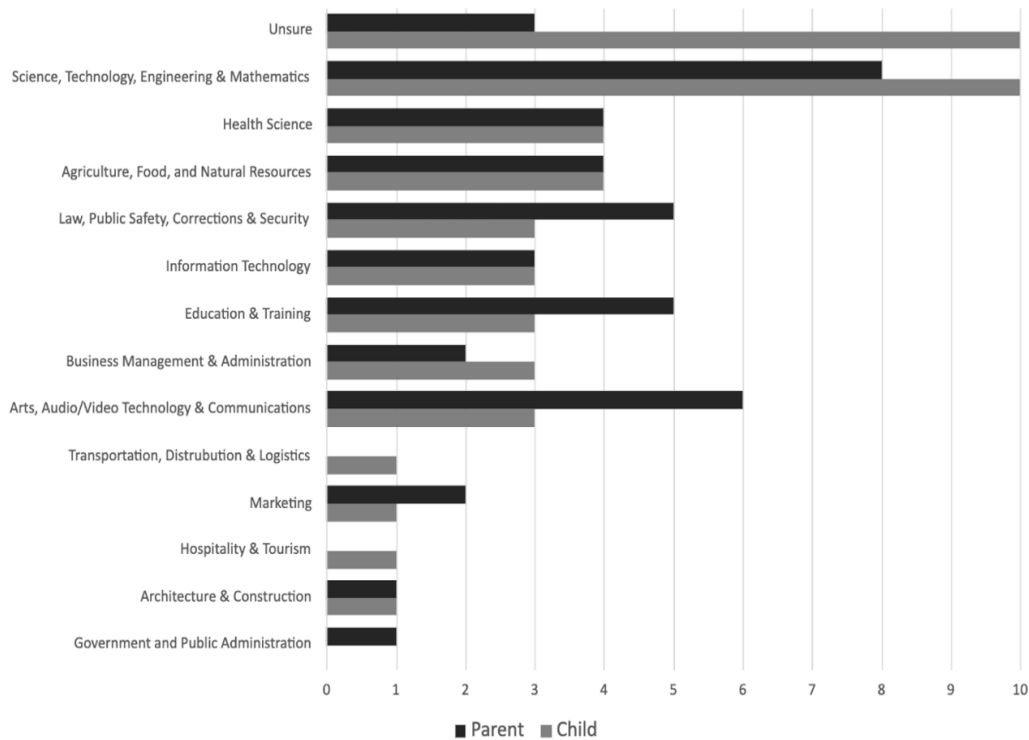
| Age | Count |
|-----|-------|
| 11  | 2     |
| 12  | 17    |
| 13  | 22    |
| 14  | 5     |

**Table 2: Demographics by Gender**

| Gender               | Count |
|----------------------|-------|
| Male                 | 23    |
| Female               | 22    |
| Prefer Not to Answer | 1     |

## Data Analysis & Results

To analyze parent's responses to the questions, "What job or career does your child want when they grow up" (Q1) and "What job or career do you feel would be a good fit for your child when they grow up?" (Q2) the researchers categorized both responses by the career cluster for which that job or occupation fit within and compared the results. The total count of the career clusters for both questions can be seen in Figure 1.



**Figure 1: Career Cluster of Interest for Parents and Their Child (Career Clusters | Advance CTE)**

The data in Figure 1 indicates there were the highest responses in the category of Science, Technology, Engineering & Mathematics (STEM) job clusters for career the child wants and the job or career the parent felt would be a good fit. The category of ‘unsure’ M indicates more parents said their child was unsure what job or career would be a good fit for themselves than parents said they were unsure what job or career would be a good fit for their child. No parent responded they, or their child, felt like careers in the following career clusters would be a good occupational fit: Finance, Human Services, or Manufacturing. An interesting finding of this study is that when asked about the career choices of children and their parents, only 35% of parents said a similar career cluster as their child.

**Table 3: All Rater Results**

|         |        | Rater 1 |        |       |    | Total |
|---------|--------|---------|--------|-------|----|-------|
|         |        | Yes     | Unsure | Maybe | No |       |
| Rater 2 | Yes    | 16      | 0      | 0     | 0  | 16    |
|         | Unsure | 0       | 11     | 2     | 0  | 13    |
|         | Maybe  | 0       | 1      | 9     | 0  | 10    |
|         | No     | 0       | 0      | 0     | 7  | 7     |
|         | Total  | 16      | 12     | 11    | 7  | 46    |

To further explore parents' perceptions of IS, the data from “Do you feel your child may be interested in job or career in Information Systems was evaluated.. Two independent researchers had an overall agreement of 93.5% and a Kappa co-efficient interrater reliability of 91.02% in the coding in all rater results as shown in Table 3.

For Q3, “Do you feel your child may be interested in a job or a career in Information Systems? Why or why not?”, two coders analyzed the data using Strauss & Corbin's open coding method. Open coding conceptualized the raw data by naming and categorizing the phenomena. The researchers analyzed single words, phrases, or sentences to foster theoretical sensitivity and compared them to the emerging categories for similarities and differences (Strauss & Corbin, 1990).

This open coding allowed the researchers to gather insights into parents' perception of IS as a career path for their child. To analyze the data, “labels of meaning” were identified and placed next to the relevant occurrence. Categorization of the coding was done in two phases. By examining “why” parents felt IS might be a good fit for their child, the researchers identified 92 codes in parents' responses that were abstracted into 19 constructs. The constructs were further reduced by placing them into categories representing themes of parental perceptions of the career decision-making process as seen in Table 4.

**Table 4: Parental Perceptions of Reasons for IS Field Interest**

| Category             | Description                                     | Constructs                                                    | f(X) |
|----------------------|-------------------------------------------------|---------------------------------------------------------------|------|
| <b>Aptitude</b>      | Ability to succeed in a task                    | Good at STEM, Good at Everything, Learner, Smart, Personality | 24   |
| <b>Environmental</b> | Influences that shape development and interests | Parent Exposure, Sibling Exposure, GenCybHer Exposure         | 9    |
| <b>Discovery</b>     | Intentional investigation of unknown options    | Exploration                                                   | 6    |

| Category  | Description                                      | Constructs                                                                                     | f(X) |
|-----------|--------------------------------------------------|------------------------------------------------------------------------------------------------|------|
| Interest  | Enjoy learning about or doing a task             | Interest Computers, Likes Computers, Other Interests, Enjoys Coding, Coding Natural, Love Tech | 22   |
| Potential | Uncertainty of influence or knowledge            | Maybe, Unsure, Unknown                                                                         | 22   |
| Values    | Things that are important and influence behavior | Opportunity, Supplementary Skill                                                               | 9    |
| Totals    |                                                  |                                                                                                | 92   |

## Findings

### Aptitude

Aptitude is defined as an individual's actual ability or capability to succeed in a certain task. The supporting constructs in the Aptitude category represent codes reflecting Good at STEM, Good at Everything, Learner, Smart, and Personality. Examples of this in the survey responses included: "Yes, she's good with technology," "Yes, he's always been naturally good with electronics, computer systems, and software," "yes, quick learner," "She is very good at science and problem-solving." The Aptitude category represents 24/92 open codes and is the largest category by numbers.

### Discovery

Discovery is defined as the opportunity to delve into exposures or situations to find matching interests, career characteristics, or experiences. Discovery is an intentional investigation of unknown options. The construct supporting the category is exploration. Examples of the codes are "That's why we're here!" and "She has a lot of interests right now that she is exploring". The parent perceptions appear to support the need to encourage exploration and discovery of opportunity matches their student's composition.

### Environmental Influences

Environmental influences shape an individual's development and interests (biology, peers, family, media, parent's work environment). The constructs developed from data are Parent Exposure, Sibling Exposure, GenCyber Exposure. Examples in the surveys include: "yes--dad in IT," "his father is a software designer / programmer, [he] has had a bit of exposure through him," "he is exposed to that at home as his mom, mom's boyfriend, and his older brother are all in this field."

### Interest

Interests are defined as a task an individual enjoys learning about or doing. The researcher's noticed interests were listed by both parents who said their child would be interested in a career in IS and those who said their child would not. Examples of this in the responses include: "Yes, he enjoys technology," "Possibly, the interest in computers," "lots of interest in technology and how it works," "yes--enjoys coding," "no--she really loves people and working with kids," "no hates cyber stuff."

The Interest category represents 22/92 or 24% of the open codes. Parents indicated both positive and negative interests representing their perceptions of their student's interest areas.

## Self-Efficacy

Self-efficacy is an individual's belief about their ability to succeed in a particular task. There was only one example of this in the research, which was, "She is good at anything that she puts her mind to".

## Value

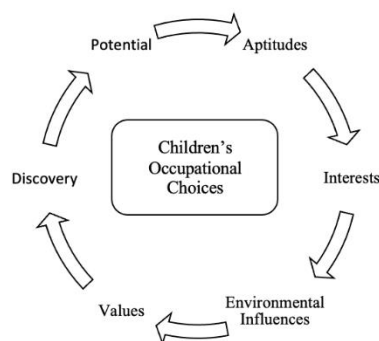
The researchers define value as things that are important to an individual and influence their behavior. One example of this in the research is, "Possibly there are a lot of opportunities in those fields." These responses indicate the parents viewed information systems as a career field with higher job security, which the parents valued. Another value area is the opportunity for continual learning as demonstrated by "you could always learn more and be taught more".

## Potential

The Potential category emerged from the constructs of "Maybe", "Unsure" and "Unknown". There were 22 instances of codes that implied the parent's perceptions of their interest in the field of Information Systems was uncertain. They ranged from maybe, to unsure to unknown. Examples of the supporting code instances are "maybe", "Unsure", "Maybe, I'm really not sure," and "Possibly, there are a lot opportunities in those fields". From the data, it is difficult to ascertain whether the parents or the students have knowledge of the field of Information Systems and its potential career matches for their student. The category represents nearly 24% of the codes. There were 15% of parents who said their child would not be interested in pursuing a career in IS. At the same time, most of these parents did not explain why, and all of those who did provide a reason related their reason to the students or themselves having other interests or expressing a lack of interest in IS. Examples include: "no--she really loves people and working with kids," "No I don't like cyber stuff."

## Discussion

As previously stated, parental influences determine children's outcomes (Bronfenbrenner, 1974). Specifically, parents' perceptions of a career can heavily influence their child's career decisions. The findings of this study reveal a parent's perception of a career choice for their child is evaluated using similar factors as those influencing children's occupational choices identified in the literature (i.e., interests, aptitudes, environmental influences, values). Adding to theories of career development, this research posits that it is essential to not only focus on the factors influencing the career decisions of an individual child but also on parents' perceptions of those factors, as seen in Figure 3.



**Figure 3: Parents' Perceptions of Occupational Choice**

For example, suppose a parent believes their child is interested in a specific career path, such as cybersecurity. In that case, they may persuade their child to participate in activities that align with that career, regardless of whether the child is interested. Alternatively, suppose a parent does not believe their child is interested in or capable of pursuing that career. In that case, they may avoid exposing them to opportunities, such as STEAM camps, which could help them gain accurate occupational knowledge and mastery experiences in that subject.

An interesting survey result displayed in Table 3 is the high number of responses indicating parents who said their child would consider a career in IS. Almost 35% of parents said yes, their child would consider a career in IS, followed by 24% who said maybe, 26% who were unsure, and only 15% who said no. The high number of parents who were unsure or said maybe is consistent with the literature that many adolescents in middle school do not commit to a career choice (Marcia, 1966). However, it is unclear whether or not parents who said “maybe” or “unsure” were unaware of their adolescent’s interests, aptitudes, values, or career decision-making processes or if they were unsure about what a career in IS would entail.

There were a variety of reasons why parents said their child would or may be interested in a career in IS. These reasons align with the career decision-making processes detailed in the literature review above. Most parents who said their child would or may be interested in a career in IS went on to explain the reason for this related to their child’s aptitude (20), followed by their interests (14 interested in IS), then environmental influences (6), and values (3). Self-efficacy was not observed in the qualitative responses. This may imply parents perceive IS to be a career choice for those with the ability and skills to be successful, more so than those with interests, environmental influences, self-efficacy, or values relevant to the field of IS. This is surprising considering the question’s wording specifically asked about interests (i.e., Do you feel your child may be interested in a job or a career in Information Systems)?

Another interesting finding of this study is that when asked about the career choices of children and their parents, only 35% of parents said a similar career cluster as their child. This may indicate that 35% are influenced by the environmental factor of parental careers. In addition, it may mean the success of outreach to middle school students providing insight into career choice options.

The Potential category finding provides the opportunity to contemplate why parent perceptions of student interest in IS are uncertain. The findings indicate that parents’ perceptions are vague related to the IS Career opportunities. They may not have the knowledge to influence students on the career path.

There were 15% of parents who said their child would not be interested in pursuing a career in IS. While the majority of these parents did not provide an explanation of why, all of those who did provide a reason related their reason to the students or themselves having other interests, or expressing a lack of interest in IS. Examples include: “no--she really loves people and working with kids”, “No I don’t like cyber stuff.”

### **Limitations & Future Research**

This study is not without limitations. The surveys were administered to the parents as they registered their child to the STEAM camp. This may have provided them with an opportunity to consult with their child if they were unaware of how to answer. However, the researchers tried to overcome this limitation by following a standard data collection procedure providing parents the opportunity to complete the survey while the students were engaged in registration activities. Another limitation is the lack of generalizability due to the population surveyed. The parents who completed the survey registered the students for the camp

and were engaged in the research survey opportunity. These actions may indicate a higher than usual level of involvement in their child's success. Future research should explore parents' perceptions of IS in different settings and amongst diverse populations.

There were differences in parents' perceptions of what they felt their child would be interested in pursuing and what they felt would be a good career choice for their child. Future research could focus on understanding these differences. For example, the difference in the Science, Technology, Engineering, and Math career cluster may be due to the increased outreach efforts focused on raising awareness. Additional research is also needed to understand responses for those parents who said their child may be interested in a career in IS, or were unsure if their child would be interested in a career in IS. Specifically, do these parents need more information about their child or the career?

Future research should focus on different age groups. The investigation of high school students and traditional freshman and sophomore university students may provide insight into recruitment, retention and anchoring students into the IS discipline.

## Conclusion

Producing more skilled professionals to meet the current labor market demands is crucial for the economy's success. Parents' perceptions of a career can influence the perceptions of their children, whether intentionally or not. This research explored parents' perceptions of Information Systems as a possible career choice for their child and found parents evaluate career choices for their children based on their perceived interests, aptitudes, values, and self-efficacy of their children, as well environmental factors. This finding extends prominent career development theories that explain how career choices are made and highlight the importance of parents' influence on their child's career decisions. Therefore, those aiming to increase the number of skilled IS professionals should focus on raising parents' awareness of the field in addition to their children.

By analyzing parent's perceptions of Information Systems, the themes identified in this research lead to a greater understanding of parent's awareness of Information Systems, expound parental influence on career decisions, offer additional insight into career development theories, and reveal how to more effectively market Information Systems and related fields to increase the number of skilled professionals in the field.

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