Exploring Destination Imagination Alumni Perceptions of 21st-Century Skills and Workforce Readiness

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Abstract
Rapid changes in technology and globalization have altered traditional demands on workplace competency requirements. This transition requires that graduates are proficient in a wider variety of 21st-century skills including creativity and innovation than in the past. The purpose of this qualitative study was to explore how Destination Imagination alumni perceived that 21st-century skills learned as part of academic extracurricular experiences informed their early career readiness. The study was grounded on the 3 constructs found in Rojewski and Hill's career-technical and workforce education framework: work ethic skills, ability to be innovative, and career navigation. Using a basic qualitative methodology, I explored the perceptions of 11 Destination Imagination alumni through semi-structured interviews. Participants were sourced from a randomized global sample of early career employed adults, who had participated on Destination Imagination teams for 3 or more years. The interview data were analyzed through two cycles of emergent coding based on the 3 constructs. The key finding was that alumni perceived their Destination Imagination experiences developed a wide variety of skills desired by employers and necessary for successful entry into the workforce. Participants recalled and described specific skills including teamwork, communication, innovation, critical thinking, creative problem-solving, initiative, decision-making, time management, emotional intelligence, and lifelong learning. The results of this study may offer insights into ways that administrators and educators might design enriched academic extracurricular activities intended to enhance much-needed 21st-century skills, thereby improving the performance expectation gap between graduates and employers.

Keywords: Destination Imagination, Extracurricular Activities, 21st-Century Skills, Workforce Readiness

Introduction

The future of work continues to change rapidly due to technological innovation and globalization (Penprase, 2018). Such rapid changes require new graduates to arrive prepared for work, with 21st-century skills and competencies to meet these challenges (Makulova et al., 2015). However, research from around the world reveals that employers across various industries perceive a significant gap between their expectations and graduate performance (Abbas & Sagsan, 2019; Kunz & de Jager, 2019; Triyono et al., 2018). To address this problem employers, educators, and students agree that the lack of 21st-century skills may be augmented through participation in various extracurricular activities (ECAs) (Nuijten et al., 2017; Pinto & Ramalheira, 2017).

In this study, I sought to gather evidence of ways that this expectation performance gap might be narrowed. I used a basic qualitative methodology to interview 11 Destination Imagination (DI) alumni. By gathering rich, thick descriptions of alumni perspectives, I sought to understand how DI alumni viewed any influence their experiences in DI may have had on their workplace skill level.

Literature Review

21st-Century Skills

At the turn of this century, as globalization and emerging technologies began to alter the workplace, businesses required their workforce to develop additional skills beyond those valued in the past (Penprase, 2018). As a result of this awareness, a diverse range of stakeholders, including international government agencies, private sector businesses, philanthropic organizations, media groups, and educational institutions, began to identify and define key competencies required to satisfy these emerging needs. Consequentially, many frameworks have been developed over the past 20 years describing the nature and scope of 21st-century skills. The term 21st-century skills refers to the core competencies of knowledge, skills, attitudes, and character traits required for success in the information age of the 21st century (Partnership for 21st-Century Learning, 2001; Rojewski & Hill, 2014; Voogt & Roblin, 2012). The frameworks cover all aspects of teaching and learning from the skills themselves, such as creativity, communication, digital literacy, initiative, and citizenship; to describing ideal learning environments, teacher training, pedagogy, assessment, and administration.

Psychological Safety and Emotional Intelligence

Two important 21st-century skills emerged from reviewing the research, that are not typically recognized in the 21st-century skill frameworks. These are psychological safety and emotional intelligence. Psychological safety relates to, but is more than, teamwork and collaboration. Described as a mental state developed in a social environment where "a shared beliefs held by members of a team that the team is safe for interpersonal risk-taking," and "a sense of confidence that the team will not embarrass, reject, or punish someone for speaking up ... that stems from mutual respect and trust among team members" (Edmondson, 1999, p. 354). The development of successful teams relies on an individual's ability to build trust, to build mutual respect, to admit mistakes, and jointly accept failure (Edmondson, 1999; Duhigg, 2016).

Emotional intelligence is described as a 21st-century skill involving "a cross-section of interrelated emotional and social competencies and skills that determine how effectively we understand and express ourselves, understand others and relate with them, and cope with daily demands" (Bar-On, 2006, p14). It involves skills such as self-awareness, flexibility, empathy, and stress tolerance. Some of these skills appear independently in 21st-century frameworks, however, both psychological safety and emotional intelligence are generally neglected in 21st-century skill frameworks. These two concepts are included in a deeper discussion related to data emerging from this study.

Workforce Readiness

Workforce readiness is defined as the preparation of K-12 students as they transition to college and employment (Malin et al., 2017). Although we are well into the 21st-century, skills such as those listed in the frameworks remain necessary for successful transition to the workforce and are still neglected in many educational intuitions. Rapid technological advances continue to create constant change across many industries, and therefore it is increasingly important that secondary and postsecondary education enables graduates to stay current and prepare students for future jobs that do not yet exist (Rojewski & Hill, 2017).

Employer Views of Graduate Skills

A summary of current research shows that employers value a variety of 21st-century skills in the workplace, placing a high importance on soft skills in particular (Pazil & Razak, 2019; Stewart et al., 2016). However, on the whole, employers perceive a significant performance expectation gap between their needs and graduate abilities (Brown, 2019; Pazil & Razak, 2019). Some of this discrepancy is industry and location dependent (Makulova et al., 2015) and employers and academics agree that clear communication is vital when describing industry requirements to academic institutions (Baird & Parayitam, 2017; Low et al., 2016). Employers, academics, and graduates each perceive that skills can be strengthened by a variety of internships and activities (Alshare & Sewailem, 2018; Jackson et al., 2016). This leaves a gap, however, in understanding the perceptions of ECA alumni and activities they may deem helpful as they enter the workforce. An increased understanding of these issues may inform educators, administrators, and parents regarding the future development of ECA experiences focused on promoting student career readiness and success.

Academic Extracurricular Activities and 21st-Century Skills

In a review of empirical studies from the past 5 years, I explored 21st-century skills developed through participation in ECAs, how the skills transferred to support graduates' early careers, and employers' perspectives on graduate career readiness. Specific ECAs were related to science and engineering, international activities, experiential activities, and performance-based activities. Participants in these studies included students still active in a variety of ECAs (Eguchi, 2016; Fondo & Jacobetty, 2019; Sahin et al., 2014), teachers and mentors (Cushing et al., 2019; Mirra & Pietrzak, 2017), and parents of students (Batubara & Maniam, 2019; Behnke et al., 2019). Students of all ages described a wide range of 21st-century skills to which they ascribed skill development through participation in various academic ECAs. Researchers concluded that participation in ECAs nurtured skills vital for career success in the changing workplace (Ozis et al., 2018) and acknowledged that the type of program influenced the specific skills learned (Chan, 2016). However, this body of research leaves a gap regarding alumni reflections on their ECA experiences and how alumni

regard the impact of those experiences on their entry into the workforce. There is no prior research into alum perceived outcomes of participation in DI.

Destination Imagination

This study specifically focuses on alumni of the DI program. DI is a global educational nonprofit, volunteer-led organization. DI focuses on small groups of students exploring STEAM (Science, Technology, Engineering, Arts, and Mathematics) through creative problem-solving activities. Involving more than 150,000 students annually from kindergarten through to college, DI operates across the United States and 30 countries throughout the world. The organization defines its mission statement as to "engage participants in project-based challenges that are designed to build confidence, develop creativity, critical thinking, communication, and teamwork skills" (DI, 2022). Thus, the focus of DI is targeted on 21st-century skill development, and I wanted to explore whether alumni found it a valuable program to develop vital skills necessary for career success.

The DI program consists of independent teams of up to seven members, facilitated by adult team managers (TMs). TMs are trained as project managers who steer students towards developing teamwork, learning new skills, and creatively solving problems. A core DI principle known as *No Interference* makes clear that TMs may not interfere with the decision-making process of the team nor guide their solution in any way. This concept of *No Interference* is the major tenet of DI precisely because it is rare for students, especially so young, to experience such autonomy. The learning made possible through such student-led projects contributes powerfully to increased 21st-century skill development.

The program consists of two types of challenges: Instant Challenges (IC) and Team Challenges. ICs are short, five-minute, creative problem-solving activities that may be construction or performance based. Teams practice solving several different challenges every week to prepare for an undisclosed challenge at a tournament in competition with other teams. The other half of the program is a Team Challenge, in which the students choose one challenge from six STEAM-based categories: scientific, technical, engineering, fine arts, improvisation, and service learning. Teams choose one challenge then develop a solution over four months and present their solution in an eight-minute performance at a tournament.

Methodology

Framework

The conceptual framework used to ground this qualitative study was the career-technical and workforce education (CTWE) framework (Rojewski & Hill, 2017). Based on 21st-century skills, the framework consists of three constructs: work ethic, innovation, and career navigation. The table below lists specific skills as organized in the framework.

Construct	Skills Identified by Rojewski and Hill
Work Ethic	Communication, collaboration, interpersonal and personal skills, e.g., dependability, initiative, perceptiveness, honesty, appreciativeness, conscientiousness, likeability, and enthusiasm
Innovation	Creativity, problem-solving, higher-order thinking, entrepreneurship, and the ability to use technology in novel ways
Career Navigation	Life-long learning, understanding technology, ability to work in nonlinear and discontinuous work environments, ability to self-start, coping-behaviors, and taking initiative

Table 1: 21st-Century Skills in the Career-Technical and Workforce Education Framework (Rojewski & Hill, 2017).

Purpose and Research Questions

The purpose of this basic qualitative study was to explore how DI alumni perceived the 21st-century skills they learned through their DI experiences informed their early careers and workforce readiness. The central research question echoes this purpose, asking, how do DI alumni perceive the 21st-century skills they learned through their DI experiences informed their early career readiness and workforce readiness? Three related sub-questions were guided by the three constructs in the framework. How do DI alumni perceive their DI experiences informed their work ethic skills, the ability to be innovative, and career navigation?

Using purposeful sampling I invited information-rich cases (Burkholder et al., 2016) from a randomized global DI alumni database of 16,000 alumni. Inclusion in the study was limited to adults, who had participated in at least 3 years of DI as team members and were in the workforce for between 6 months and 4 years. Participants were offered a $10 Amazon gift voucher for participating.

Participation in the study occurred in three cascading stages. An initial email invitation led to an informed consent form, and in turn to a demographic questionnaire. I then scheduled and conducted 11 semi-structured interviews providing rich, thick descriptive data on participants' perceptions (Ravitch & Carl, 2016). Interviews were conducted on Zoom and audio recorded with permission. This method of data collection was the most practical choice because participants were geographically distant from me. I asked seven questions during interviews that lasted 45 to 60 minutes each. I transcribed the recordings using Kaltura and emailed the transcriptions to participants for member checking.

Consideration was given to ensure that this study was ethically managed. Questions were field tested by university mentors, and transcripts were member-checked by participants. Participants' details were de-identified to assure confidentiality. This methodology was of low risk to participants and data was backed up on flash drives.

Data Analysis

I coded in two cycles (Saldaña, 2016) using Microsoft Word, and Excel to store and organize data, and the software program Dedoose, to help me organize data during the analysis phase. Based on 312 participant excerpts I identified 32 specific skills that participants described

and sorted them under each construct: work ethic, innovation, and career navigation. The following three figures provide a clear visual of the skills that participants identified as learning in DI.

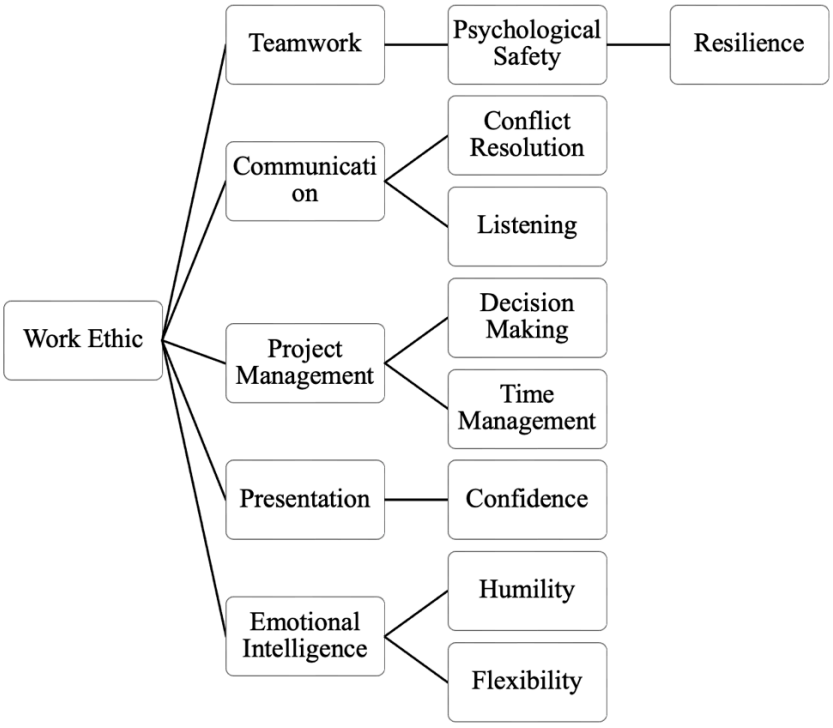

Figure 1: Work Ethic Skills

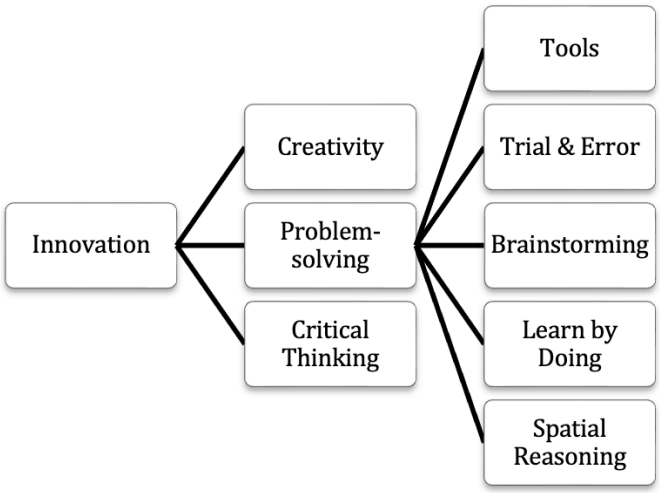

Figure 2: Innovation Skills

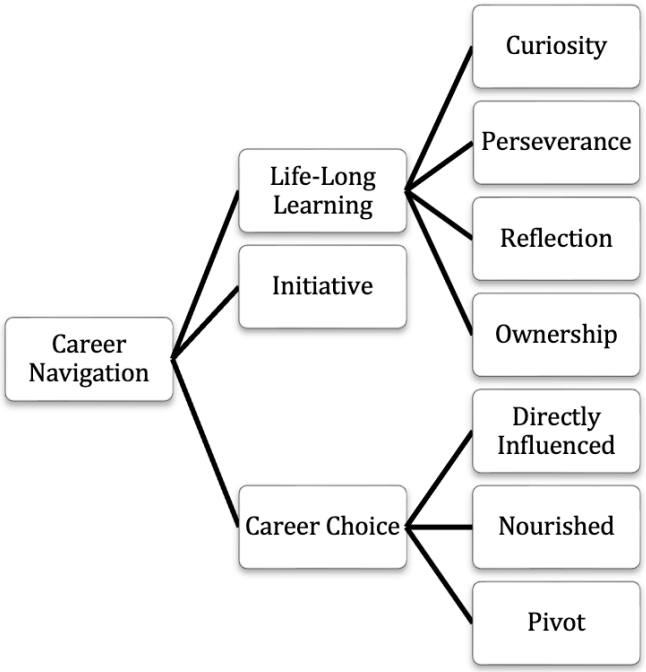

Figure 3: Career Navigation Skills

Results

Findings from the Central Research Question showed that Destination Imagination alumni described experiences that supported a variety of skills desired by employers in the workplace. In support of prior research, the richness and depth of these discussions demonstrate that participants benefit enormously from such extracurricular activities. And as previous authors have noted, the results can be unexpected and long-lasting. However, prior to this study, few researchers have attempted to tap into alumni perspectives, a useful approach considering that young adults entering the workforce offer reflections on the applications of their learning.

The key findings indicated that DI alumni perceived that their DI experiences helped develop specific 21st-century skills related to the work ethic construct. These skills include teamwork, communication, presentation skills, project management, and emotional intelligence (see Figure 1). Participants were able to identify specific skills and describe how they applied them in various work situations. Specifically, these skills included delegation, valuing others, goal setting, accepting criticism, risk-taking, belonging, bouncing back from failure, written and spoken communication, ability to listen, conflict resolution, self-confidence, problem analysis, optimization, prioritization, humility, flexibility, research, and working to deadlines.

DI alumni participants perceived that their DI experiences informed their ability to be innovative and creative (see Figure 2) by teaching them how to solve problems creatively, think critically and quickly, to use a variety of building tools, develop spatial reasoning, and to learn by doing. Participants explained how through DI they developed perseverance and the willingness to rework products several times until they are satisfied. They learned to view problems from different perspectives, to think “on their feet” and “out of the box” to create something unique and novel. They explained that they valued these skills and felt that these skills gave them an advantage over peers in their workplace.

Additionally, alumni articulated that participation in DI helped them gain admission to college, secure jobs, and keep jobs (see Figure 3). Participants described experiences that they felt, not only increased their awareness of different careers, developed their interest in STEM fields, and influenced their career paths, but also enriched their personal lives. Further, DI alumni perceived that they developed a variety of skills that supported their career readiness and helped them keep their jobs, such as initiative, life-long learning, curiosity, self-reflection, goal setting, and ownership.

Discussion

Figure 4 contains a table of quotes from participants to illustrate each code and provide some insight into the depth of reflection that emerged through these interview conversations. They support participants' convictions that DI had helped develop their early career and workforce readiness. Participant 1 said, "I don't think I'd be as good at my job, as I am currently, without the skills that DI gave me." Participant 6 explained, "Destination Imagination taught me that the answer is there, you just have to go get it, or create it on your own. It's a way of thinking." This quote reflects perseverance and a belief that there is a solution to every problem and a growth mindset that it can be accomplished.

Emotional intelligence is rarely mentioned in the 21st-century skills frameworks. It encompasses personal traits such as humility, flexibility, and the ability to 'read others' emotions, skills which are vital to career success. Participant 2 shared that a skill she learned in DI was that "things constantly change, and you have to adapt on the spot," speaking about the need for flexibility. Participant 3 discussed the need for humility when working with others as she recognized that, "sharing the credit is a big thing."

A second, rarely discussed, 21st-century competency emerged from these discussions, that of psychological safety. This relates to how comfortable individuals feel in a team, a sense of belonging, and mutual respect. The ability to take risks without fear of embarrassment or criticism, and yet still take ownership for their own mistakes and learn from them, ultimately increasing the team's success. This statement from participant 10 speaks to the psychological safety effect of working in close teams, mentioned earlier, that gives students confidence, and a sense of belonging and success. "Destination Imagination gave me a stronger sense of belonging and improved my confidence ... It gave me purpose, responsibility, and lifelong friends." This set of skills, vital to successful teamwork seems to be engendered through DI teams.

Construct	Child Code	Sub-Code	Exemplar Excerpt for the Code
Work Ethic	Teamwork		"You work with a team in DI ... it's one of the awesome things that prepared me for working with people" (P11) "Valuing everybody's contribution" (P5)
		Psychological Safety	"Not being afraid to pull someone else in and ask for help" (P9) "Always you can improve, take the criticism and run with it, don't get offended by it" (P11) "Failure was really valuable; we were still really proud" (P6)
	Communication		"[DI] helped my writing, strengthen how I explain something" (P2) "Being more concise in what I'm saying" (P1)
		Conflict Resolution	"Dealing with people who have different opinions and be able to clear headedly pick out which solution is going to be the best for the problem" (P11)
		Listening	"DI definitely teaches you ... when you need to listen" (8)
	Project Management		"Being able to delegate those different pieces out to different people and find ways to take giant tasks and make them sizable, starting with DI for me" (P6)
		Decision making	"We had to research different things" (P8) "how they prioritize what they thought" (P8) "how can they optimize their solutions" (P11)
		Time Management	"You don't have all the time in the world ... this is going to get done" (P3)
	Presentation		"Talking to adults and showing off your best stuff ... showcase yourself, to get that job" (P7)
		Confidence	[DI was] "super instrumental in bringing me out of my shell when I was a kid" (P9)
	Emotional Intelligence		"Social interaction with other people, you have a lot of different personalities, and that is definitely something that comes up in DI" (P2)
		Flexibility	"Things constantly change, and you have to adapt on the spot" (P2)
		Humility	"Sharing the credit is a big thing" (P3)
Innovation	Creativity		"DI helped me an incredible amount just fostering that outside-the-box, creative thinking" (P11). "It's more valuable if you can make something your own" (P6)
	Problem-solving		"Creative problem-solving, which is pretty much what DI is" (P11)
		Tools	Learning to sew, paint, pulleys, hot glue, staple gun, power tools, Python, Sign Language, Excel
		Trial & Error	"I'm going to take what I have and make it better for version 2 ... You realize you're going to have to keep revising stuff until it gets perfect" (P3) "Fast thinking that what Instant Challenges instills" (P1) "Having to build everything completely from scratch ... actually build things with their hands" (P5) "In order to make anything you have to have a picture in your head" (P11)
	Critical thinking		"A lot of the critical thinking skills [I learned doing] ... Instant Challenges and even doing the Central Challenge has really helped me being an engineer" (P5)
Career Navigation	Life-Long Learning		"I have to continuously work to always be the best version of myself" (P11)
		Curiosity	"I would definitely say a craving for learning is what DI has given me" (P7) "When I want to learn something new I'll sign myself up for it, and that comes from DI" (P6)
		Perseverance	"I you really want something to happen you have to campaign really hard for it" (P6)
		Reflection	"I'm very introspective ... reflecting on how certain experiences have affected me, and maybe that's attributable to DI" (P9)
		Ownership	"I saw all of my students rise to the occasion because they had ownership and that's what DI gives students" (P6)
	Initiative		"My advisors compliment me that I take initiative on a lot of stuff, and I do my own projects without necessarily asking first" (P2)
Career Choice	Directly Influenced		"A lot of the whole reason that I believe I'm an engineer is because of DI" (P5)
	Nourished		"I've always been an engineering focused person ... but I will say that DI really nourished that" (P11)
	Pivot		"DI let me trust that I was Ok not knowing what I wanted to do [as a career]" (P6)

Figure 4: Code Tree with Participant Quotes

One of the fundamental tenets of the Destination Imagination program is non-interference. Adults can teach skills and can foster a safe environment where psychological safety can thrive, but they may not interfere with decisions the team makes, as described in the DI section above. This belief in student ownership of their own work, and trust that children are capable seems to be a productive method of developing many different 21st-century skills required for the changing workforce.

Limitations

Time is always a limitation in any study and Covid-19 pandemic restrictions may have altered participant accessibility to the study. The somewhat self-selecting nature of the participant pool, randomized from a database of 1,600 DI alumni to which they voluntarily submitted their names, may suggest that this list of individuals had favorable DI experiences. A further limitation of this study may be that, of the eleven participants, only two were male participants, potentially lacking alternative perspectives.

Future Research

Further study into how employers perceive the skillsets of DI alumni compared to non-DI alumni may provide information to stakeholders to strengthen student support and broaden experiential learning programs. A second avenue of research might be to capture the views of team managers and parents of DI participants as they perceive the benefits of the program. Third, these alumni perceived that participation in DI helped them gain admission to college, secure jobs, and keep jobs. Participants described an engaging, motivating ECA environment that helped them navigate the challenges between school, college, and career. More research needs to be undertaken into documenting ways that these basic tenets of DI, as described by participants in this study, including ownership, independence, and psychological safety, might be extended into more mainstream education.

Implications

The potential social implications of the study may include raising administrator, educator, and parental awareness of the influence of academic ECAs to improve the performance expectation gap between graduates and employers. Such insights may inform innovative instruction by reinforcing practices or extending thinking into creative ways to develop much-needed 21st-century skills, knowledge, and abilities.

Conclusion

The alumni in this study described numerous experiences from their time in DI teams that supported the development of skills desired by employers and necessary for successful entry into the workforce. Participants specifically described skills including teamwork, written and spoken communication, conflict resolution, listening skills, decision-making, time management, confidence, flexibility, humility, creativity, problem-solving, spatial reasoning, critical thinking, curiosity, perseverance, reflection, ownership, resilience, and life-long learning.

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