

Collective Intelligence In Honors Program: Gifted Students Improved Creativity, Leadership, Entrepreneurship, Motivation, And Satisfaction In University Life

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Abstract:

The purpose of the current research was to explore the extent to which a proposed honors program facilitates the development of creativity, leadership, entrepreneurship, motivation, and satisfaction of gifted students in university life, and provide feedback on the program's quality. In the era of AI's minds that exceed humans in speed, problem-solving, and fast learning algorithms, there are pressing needs for integrative and creative talented minds to form a super intelligent brain for innovative solutions that benefit society. The new millennium is full of challenges, that require a collective intelligence (CI) of gifted students to propose innovative solutions and think collaboratively to solve real-life problems. Higher education institutes ought to capitalize on gifted students' intelligences to advance knowledge. Both quantitative and qualitative research design were employed on a volunteer sample consisted of 59 gifted students. The results showed that proposed honors program had achieved positive impact on students' satisfaction, perception of program quality, motivation, creativity, and leadership. Gifted students pursued honors program form prestige, soft skills development and interactions with like minds. Further, qualitative results showed that CI of gifted students in honors program resulted in grand awards at national competition in innovative problem solving sponsored by a third party. Despite the limitations, it is very crucial that gifted students work collectively with like minds to develop a practical skill towards challenging issues that require CI.

Keywords: Higher Education; Soft Skills; Problem Solving; Project-Based Learning and Innovation.

I. Introduction

In an era where artificial intelligence (AI) exceeds humans' speed, problem-solving, and fast learning algorithms, there is a pressing need to cultivate integrative and creative talented minds to develop innovative solutions that could benefit society. The new millennium presents many challenges that require a collective intelligence (CI) of gifted students to propose innovative solutions and think collaboratively to solve real-life problem (Mignenan, 2021). Higher education institutes ought to capitalize on gifted students' intelligence to advance knowledge.

Only a few colleges and universities provide programs to serve gifted students to foster and exploit their CI (Almukhambetova & Hernández-Torrano, 2020; Mendaglio, 2013; Rinn, 2006; Rinn & Plucker, 2004; Wilson & Adelson, 2012). Although a plethora of services for gifted students are available across the K-12 education range in many countries, including Saudi Arabia, gifted students feel lost and isolated when they reach their undergraduate programs, i.e., as if their gifted potential has disappeared (Hébert & McBee, 2007). Giftedness is not an incidental phenomenon and should not be perceived as a

precarious investment for countries. Students identified as gifted and who completed their general education should continue to receive services and empowerment according to their intellectual, psychological, and social needs to fulfill their latent but demonstrated potential, which would yield an optimal return on countries' relevant social investments (Brandon et al., 2021; Almukhambetova & Hernández-Torrano, 2020; Hébert & McBee, 2007). Serving gifted students in higher education not only boosts students' performance and prepares them to work in challenging environments, but also enhances the images of colleges and universities, helps improve an institution's academic reputation and ranking, and contributes to societal development. Leading universities in the world strive to recruit top-tier students to elevate their reputation and internal and external efficiency (Rinn & Plucker, 2004). Thus, it is essential that universities make a genuine effort to recruit and retain the brightest students from a wide range of communities by offering them elite programs, like an honors program, to nurture and develop their talents and advance knowledge and innovations.

Planned educational experiences like honors programs for gifted, multi-talented minds at university are one of the most precious opportunities accessible to gifted students wishing to fulfill their potential and create a conducive environment for them to excel. Although general education may offer many educational opportunities for gifted students that focus on individual development, the university life experience is quite different. For instance, young adults, whose talents are in an advanced stage, could embark on a talent development pathway via interactions with like minds, allowing them to appreciate, collaborate, and innovate collective solutions or products (Almukhambetova & Hernández-Torrano, 2020; Chancey & Lease Butts, 2021; Rinn & Plucker, 2004; Hébert & McBee, 2007). Collaborations

and interactions of CI are like a series of multidisciplinary interactions that will lead to significant personal development and afford a context for innovation, based on high-performance profiles and a diversity of top-tier minds (Nájar & Morales, 2021).. It offers a precious opportunity for gifted individuals' intellectual, emotional, and social development (Hébert & McBee, 2007). Gifted and talented college students' interactions would enrich their experience through both explicit and implicit curricula across multiple disciplines. According to Olszewski-Kubilius (1998), shared interests and respect for intellect are influential factors in building new friendships in gifted populations. Interactions in honors programs provide gifted students with high exposure to knowledge, skills, values, and passions.

In a highly structured and constructive higher education environment, gifted and talented minds would find an honor program a great opportunity to exercise their talents, skills, and attitudes and receive constructive feedback without fear of failure, since they are in an educational setting. It also helps gifted students adapt socially and emotionally to academic programs and university life, which is imperative for successful personal development (Almukhambetova & Hernández-Torrano, 2020; Renzulli, 2021). Moreover, opportunities like honors programs offer a wide range of educational alternatives, including challenges, real-world problems, complex problem-solving exposure, and personal experiences that evoke motivation, creative and critical problem solving, and leadership and teamwork opportunities—all of which are key elements for gifted students in the workplace. These soft skills have become core competencies in the 21st century (Bellanca & Brandt, 2010; Hodge & Lear, 2011; Organization of Economic Co-operation and Development [OECD], 2011, 2014; Trilling & Fadel, 2010). The World Economic Forum [WEF] (2022) highlighted that work skills that would shape the work landscape

in the upcoming decades include creativity, AI, leadership, and teamwork, which were at the top of the list. The one skill that cannot be replicated with AI was innovation.

Focus on these skills has increased significantly over the last several years, in accordance with Saudi Vision 2030. For instance, the National Qualifications Framework established by the National Center for Academic Accreditation and Assessment [NCAAA] (2015) emphasizes soft skills, and specifically the subskills of innovation, leadership, and teamwork, in addition to knowledge outcomes for higher education learning results: "These include personal characteristics such as honesty and reliability, capacity to work effectively in groups and provide leadership, a wide range of thinking and problem-solving skills, the ability to communicate effectively with different types of audiences, and the ability to investigate new and unexpected problems. Upon graduation, students are expected to have developed attributes in five domains: academic knowledge, cognitive skills, interpersonal and responsibility skills, communication and information technology skills, and psychomotor skills (p. 3). Nevertheless, it is unclear to what extent these skills are perceived as necessary and taught by universities, academic programs, or faculty members.

Unfortunately, not many countries consider reports on students' workplace skills promising (Bellanca & Brandt, 2010; Ministry of Economy & Planning, 2010; OECD, 2011, 2014; Trilling & Fadel, 2010; WEF, 2020). The Closing the Skills Gap report produced by the WEF (2020) noted that today's organizations in the public and private sectors need improved ways to prepare the workforce of rapidly evolving economies with lifelong learning, innovation, and problem-solving skills, which will enable them to deal with undefined and unfamiliar situations. Hosting honors programs in universities affords the opportunity for intense intellectual and social

interactions that are quintessential for gifted students' development in preparing them for successful career interactions. Gifted students might suffer stress, anxiety, and low motivation due to their intellectual, social, and psychological isolation in the workplace, due to the differences between their abilities, interests, life goals, value, principles, and cultural backgrounds. According to Hébert and McBee (2007), an honors program provides gifted students with intrinsic motivation that is not available in another program. They benefit more from the collegial program than from the classes. Therefore, the purpose of the current research was to explore the extent to which a proposed honors program would facilitate the development of these skills, help students overcome trials in the workplace, and surmount social and psychological challenges.

2. Literature Review

Many universities worldwide are keen to recruit the brightest and most talented students, even though they meet these students' everyday needs in university life only to a limited degree (Mendaglio, 2013; Rinn, 2007; Rinn & Plucker, 2004; Wilson & Adelson, 2012). However, gifted students with a strong yearning for learning find themselves isolated, bored, and frustrated among average students (Southern & Jones, 1991; Hébert & McBee, 2007). Honors programs provide an excellent opportunity for gifted students to grow intellectually and socially by offering advanced courses in various domains, with concomitant exposure to students and experts of the same ilk, where they could be stimulated academically, intellectually, and socially. Honors programs would be attractive to gifted students if they were challenging and aligned with their interests and desires, offered flexible opportunities across a wide range of disciplines, and demanded high expectations from students to push them out of their comfort zone to realize their growth potential. In terms of social development, honors programs provide

gifted students access to like minds with whom they may interact, as well as the opportunity to be mentored by expert tutors in their respective fields of interests who could provide guidance, support, expert knowledge, and constructive feedback.

Several international universities host honors programs for gifted and talented students to attract the top tier of human capital to boost their institutional ranking (Gerrity et al., 1993; Mathiasen, 1985; Pflaum et al., 1985). Students with high achievement records can be affiliated with such programs in these universities, where they receive special attention and enrich informal educational opportunities. A limited number of students are awarded diplomas upon graduation with honors if they complete such programs. In addition, gifted students receive financial aid and pay lower tuition fees upon admission. For instance, in Georgia, according to Fischer (1996), less than 10% of each freshman class of 5,000 is admitted to the honors program.

Although admission to honors programs is based on cognitive ability scores like the Scholastic Aptitude Test (SAT) and American College Testing (ACT), identification of gifted students at this developmental age level must rely more on performance and achievement-based assessments than cognitive tests scores. As Subotnik et al. (2011) noted, giftedness can be seen as a developmental phenomenon in younger years, where potential is the key variable. At later ages, achievement is the measure of giftedness as fully developed talents. Eminence of talents, though, is the basis on which this label “gifted” is bestowed. Since youths in higher education are supposed to have had opportunities during K-12 education to be identified and nurtured through a systematic program, the target of the current study was proven talents in various fields. For the proposed program, gifted students were recruited to the current honors program by adopting the U.S. Department of Education’s definition of giftedness, also called the “Maryland definition,”

which includes the following areas of talent: intellectual ability, specific academic aptitudes, creative thinking, leadership ability, and skills in visual and performing arts. The following criteria were used to select gifted and talented students: (a) excellence, (b) rarity, (c) productivity, (d) demonstrability, and (e) value, as proposed by Sternberg (1997) in his pentagonal implicit theory of giftedness.

Honors programs in universities offer gifted students a broad and deep experience. According to Hébert and McBee (2007), honors programs typically offer honor courses, seminars, smaller classes, interdisciplinary classes, mentoring, projects, leadership opportunities, research programs, increased faculty contacts, extracurricular activities, and services activities. In such programs, gifted students are offered wide and flexible alternatives that stimulate intrinsic motivation and passion. Hilliard (2010) stated that students’ early involvement in leadership activities will help them maintain a positive attitude toward self, community, workplace, and social life. According to Fredricks et al. (2010), students in similar programs had more positive experiences with volunteer work than the academic syllabus because they developed initiatives, directed efforts, motivated people to engage in challenging goals, engaged in complex problem solving, developed plans, and monitored strategies and progress. They also developed social and emotional competencies, formed supporting relationships, and engaged in identity exploration.

Minimal efforts are made to continue identifying and nurturing gifted students’ potential in Saudi Arabia’s higher education system. Gifted education at the higher education level is an area neglected by practitioners, scholars, researchers, and policy makers. Although young adults who received gifted education services during their K-12 education would benefit from such programs at university, very little consideration has been

given to help such gifted students attain their potential peak. While university education would provide a more organized opportunity to prepare gifted students to be future leaders in their fields, only fragmented efforts by some universities in Saudi Arabia were found to serve this segment of the population.

The advantages of honors programs are unlimited. For instance, bright students tend to interact more often with top faculty members, and receive more individual attention from those advisors, which fosters a sense of learning and community engagement (Almukhambetova & Hernández-Torrano, 2020; Hébert & McBee, 2007). Moreover, smaller numbers of students enroll in classes where interaction with faculty members is deeper. If designed well, honors programs could open more doors for gifted and talented students to universities' top facilities and human resources. In some universities, gifted students are allocated one dorm to increase friendship and interactions with their peers, underpinned by extra-curricular activities like guest speakers, peer advising, and mentorships. The sense of community in an honors program supports students intellectually, emotionally, and socially. Gifted students would not only improve their employability, but also be more successful achievers in academia and life.

2.1 Collective Intelligence (CI)

The concept of CI refers to group intelligence (GI) that manifests from the collaboration, collective thinking, and problem solving of many individuals in various settings. This concept appears in many domains of science, including psychology, sociology, information and communication technology (ICT), business, engineering, AI, innovation, and medicine. It is the synergy of people's interaction with knowledge, and challenge at hand (Suran et al., 2020). In psychology, CI refers to the assembly bonus effect, in which "effective interaction is held to allow group members to combine their

individual knowledge in a manner that produces higher quality outcomes than would have been attributable to a combination of individual members' efforts" (Tindale & Larson, 1992). Some refer to CI as crowd wisdom, collective behavior, crowd sourcing, and group mind (Woolley et al., 2010). Pierre Lévy defines CI as "it is a form of universally distributed intelligence, constantly enhanced, coordinated in real time, and resulting in the effective mobilization of skills" (Levy, 1998). CI is important for society and individuals' developments (Lévy, 2007; Jenkins, 2006). CI features to overcome individual biases, enhance intellectual performance, effectively solve problems, build solutions taking into consideration a diverse overview, create innovative outcomes, achieve consensus and buy-in course of action. Much of CI is attributed to two structures: bottom-up and top-down (Woolley et al., 2015). Bottom-up structure includes individual intelligence, talent composition, diversity, social and emotional sensitivity. Top-down structure includes group interaction, communication, structure, processes, and norms. Therefore, leadership skills are a very essential skill in CI's effectiveness. It has been reported that CI exceeded individuals' intelligence on various tasks, in addition that individuals' intelligence improved alongside (Aggarwal et al., 2019). However, while individual intelligence can predict performance on various tasks, CI has still to be investigated.

2.2 Motivation, Creativity, and Leadership

The researcher assumes that motivation, creativity, and leadership are among the most essential constructs to be developed in any honors program for gifted students. Gifted students in higher education institutes are not challenged enough. Since academic programs are designed for average students. They were not given the chance to interact with like or diverse minds to thrive in education attainments, nor were they

given opportunities to practice leadership skills that are important for leading change expected from them. Leaving gifted students with unchallenging educational opportunities may lead to boredom feeling, less motivation, staying in their comfort zone, and thus locked their latent potential. Creativity is a core asset for any society, so developing such a facet of people capitalizing on CI is of great value. However, achieving such assets requires good leadership skills for people leading such change.

The three constructs researched in the current study: motivation, creativity, and leadership are the underpinning supplementary ingrediency of CI, in authors view, in addition to other psychological and social elements beyond the scope of the current study. Motivation is defined as “a need of desire that energizes and direct behavior.” (Myers, 2010, P.443). Drive-reduction, optimum arousal, and hierarch motivational theories conceptualized students’ motivation in the current honors program. According to Myers (2010), drive-reduction theory arises from homeostasis, which means gifted students have a natural tendency to high performance, so they need to be intellectually challenged. Thus, the honors program drives them to explore challenging tasks and projects to restore their normal state. Moreover, curiosity drives gifted students to enrich and explore new problems and challenging opportunities in such programs, seeking an optimal level of arousal. Further, the proposed honors program emphasized the upper three levels of Maslow’s hierarchy, including esteem, self-actualization, and self-transcendence needs. Gifted students were given opportunities to make significant achievement, recognition, and respect from others. They were given the chance to live up to their fullest and unique potential and develop meaning beyond the self.

The creativity, on the other side, is defined as “the ability to produce ideas that are both novel and valuable.” (Myers, 2010, P.443) Identifying

gifted students based on certain intellectual criteria does not necessarily reveal creative potential, because intelligence and creativity entail different thinking processes: convergent and divergent. Sternberg and his colleagues (1999) proposed five components of creativity, including: expertise, a well-developed based on knowledge; imaginative thinking skills, the ability to see things in novel ways; a venturesome personality, seeking new experience, and tolerates ambiguity and risks and preserves in overcoming obstacles; intrinsic motivation, is driven by interest, satisfaction and challenge by external pressures (Amible & Hennessey, 1992); a creative environment, that supports and refines creative ideas in which productive collaboration and relationship with colleagues is very important. All these creativity components, in addition to gifted and talent components in diverse domains, were the main features of the proposed honors program.

The last construct was leadership, lack of such competent in group dynamics, CI may fail to achieve prosper outcomes. Woolley et al. (2015) suggest that the individual skills most critical for CI are those that enhance the ability of group members to collaborate effectively, or that enrich the collaboration by bringing sufficient perspectives. Thus, it was an essential target in the honors program to elevate the leadership skills of gifted students. Researchers have found that talented and smart people have difficulty processing and managing social groups (Cantor & Kihlstrom, 1987; Weis & Sub, 2007). As the new millennium is full of cultural, economic, social, demographic, and political challenges, that require new skills to complement students’ academic knowledge and potential. Gifted students must be equipped with leadership skills to achieve success and contribute vitally to economic development and societal growth (Hodge & Lear, 2011; Trilling & Fadel, 2010). A recent WEF (2022) report highlighted the top 21st-century skills, including leadership, that

every student needs to be ready for employment. These skills are developed primarily through social and emotional learning. Unfortunately, explicit opportunities to improve leadership skills are minimal. Their acquisition is often left to coincidence or “picked up” during other activities and is not systematically nurtured in academic programs at Saudi higher education institutions. Hilliard (2010) stated that students’ early involvement in leadership activities will help them have a positive attitude toward self, community, workplace, and social life. Thus, it is vital for students in academia to practice leadership skills with peers, and they should not be nurtured in isolation, as prosperity in professional life requires these skills. Graduates often leave universities with a wealth of knowledge, but less mastery in leadership skills.

In leadership, early theories explain what makes a good leader and how a leader can be effective. The major theories include, *inter alia*, trait theory, situational theory, participative theory, transactional theory, and transformational theory. Northouse’s (2012) framework of leadership, based on three categories (administrative, interpersonal, and conceptual), and situational leadership theory. Northouse’s framework, in alignment with the work of other scholars (Matthews, 2004; Mumford et al., 2015), depends on several key leadership skills, including strategic planning, managing resources, divergent thinking, communication and conflict resolution skills, various elements of emotional intelligence, and problem-solving. They contend that effective leadership is task-relevant, and successful leaders adapt their leadership style to the situation at hand. Defining the concept of leadership, its subskills, and effectiveness is complex, as there are several definitions, theories, and attributes offered by scholars (Goleman et al., 2013; Kim, 2009; Lee & Olszewski-Kubilius, 2006; Matthews, 2004; Nahavandi, 2012; Northouse, 2012). In the current study, students were assessed based on

their perception of mastery of leadership skills, including leading self, leading others, and community involvement and network.

2.3 Purpose of the Study

The purpose of the current study was to explore how honors programs that integrate a pool of talents foster gifted students’ creativity, leadership, motivation, and CI. The underlying assumptions are that collective talented minds would enrich gifted students’ development and stimulate innovative solutions. The author used the first and fourth levels of the Kirkpatrick model (1996; 2006) to evaluate training programs to determine whether such honors programs were worth pursuing to develop gifted students’ skills and CI. The following questions consequently guided the current study:

1. How did gifted students perceive the honors program regarding quality, soft skills, creativity, leadership, and motivation?
2. What were the factors that contributed to students’ satisfaction with the honors program?
3. What was the evidence of effective CI in solving real-life problems?

3. Method

In the current study, a mixed-method design was used. An observational research design was used to answer the first two questions, while a qualitative case study method was used to answer the last question. The author used the first and fourth levels of the Kirkpatrick model (Kirkpatrick, 1996; 2006), *i.e.*, the reaction level and result, respectively, to analyze and evaluate the results of the program. The dependent variable was students’ reactions to four dimensions of the honors program: (a) program quality, (b) student’s motivation, (c) creativity, and (d) leadership. For the case study, outcome examples of CI work were presented, and insights were gained about the students’ achievements. This study assessed the effect of a one-year

honors program on several dimensions as perceived by gifted students. The rationale was to improve the students' experience in the forthcoming programs and attract more gifted students, since the program was newly introduced, by exploring important components that were attributed to gifted students' satisfaction with this program.

3.1 Participants

A total of 59 talented students in a higher education institute voluntarily participated in the current study. The study and honors program took place at a public university in the Eastern Province of Saudi Arabia. The participants were undergraduate students (44 female, 15 male). The higher percentage of females in the study represent the demographic distribution of the university, whose student body is approximately 25% male and 75% female. The participants represented four academic clusters: health sciences, engineering, art, and humanities.

The honors program used both norm- and criterion-reference assessments to identify exceptionally gifted and talented individuals in the following domains: (a) intellectual abilities, (b) academic performance, (c) creativity and innovation, (d) leadership ability, and (f) visual and performing arts. For the first two domains, the selection of gifted students was based on norm-reference results, while for the other domains, the selection relied on criterion-reference assessments. Based on Sternberg's (1997) pentagonal implicit theory of giftedness, the following criteria were used to shortlist nominees: (a) an eminence of giftedness and

talent in one of the areas specified by self, colleges, clubs, or admission offices, (b) excellence in performance areas compared to candidate peers in the pool adjudicated by experts in their respective fields, and (c) demonstrated giftedness and talent in the field based on scores and portfolios of candidates.

The selection of gifted students in the honors program encompassed four stages, as per the recommendations of Heller (2004): nomination, verification, proved evidence, and then the final selection decision, based on program capacity. In the nomination stage, the purpose was to reach as many potentially gifted and talented students as possible to minimize a possible false negative selection. The honors program had various nomination channels for gifted students, including open nominations for all students, and college, club, and admission office nominations. Announcements and invitations of potentially gifted students were sent throughout the university via email and official letters regarding recruitment to the honors program, as well as a guide on how candidate students could apply. Students were asked to complete a nomination form, which consisted of demographic information and areas of talent. Evidence of areas of talent could be attached and submitted by various means, including documents, videos, portfolios, etc., attendance at previous gifted programs, and previous cognitive and achievement scores. A pool of 1,621 candidates of potentially gifted students had submitted their applications in the first round of the honors program, as reflected in Table 1.

Table 1: Distribution of nominees across talent areas and gender

Talent area	Male	Female	Total
Intellectual ability	105	576	681
Academic ability	81	586	667

Creative thinking	10	102	112
Leadership ability	24	73	97
Visual/performing arts	6	58	64
Total	46	327	1621

In the second stage, verification of students' applications and profiles was performed according to the following criteria: completion of application, evidence of exceptional performance, and students' enrollment in the university. A committee consisting of five faculty members in relevant talent areas, led by an expert in gifted education, then set the criteria, and used consensual assessment techniques to shortlist the candidates, followed by an interview of candidates themselves.

In the third stage, the reviewers used talent-specific criteria to adjudicate students' profiles compared to their peers, to make the final decision about the selection. The following criteria were used for selection: For intellectually and academically gifted students, students had to report scores on a cognitive ability test (General Ability Test [GAT] or SAT) and academic achievement that placed them in the top 90th percentiles. Nominees also had to show evidence of achievements based on either standardized test

scores, high school achievement, or grade point average (GPA). For creative and innovative work, nominees had to demonstrate a creative product or invention, or high performance in creativity relative to their peers. For leadership ability and visual and performing arts, nominees had to demonstrate evidence in support of their talent areas approved by experts in those fields. Students were also called to interviews with a panel of two faculty members who were experts in the relevant fields to validate applicants' portfolios and determine students' passion to be enrolled in the honors program (Fredricks et al., 2010). A total of 134 talented students were finally selected, as shown in Table 2. The final selection represented the top 8% of the candidate pool, making up 0.5% of the university population. All students were invited to an orientation session about the honors program, where the honors program team explained the benefits and responsibilities to all selected students. Students had to sign a consent form to fulfill the requirements of the honors program.

Table 2: Participants' demographic distribution in honors program

Talent area	Male	Female	Total
Academic ability	17	61	78
Creative thinking	3	21	24
Leadership ability	3	18	21
Visual/performing arts	1	10	11

Total

24

110

134

3.2 Description of the Honors Program

The proposed honors program aims to identify and serve gifted students. The underlying assumptions of the honors program embrace the view that gifted students need a provocative environment to be empowered, and that collective minds of talented individuals release immense capabilities of individuals and societies. The honors program required students to achieve 100 training and service hours by enrolling in both structured and unstructured educational activities. Gifted students needed to enroll in challenging opportunities that enabled them to prosper in life, which the honors program set out to achieve, and also to prepare those students to become future leaders in their fields.

A new honors program was introduced in a public university in Saudi Arabia to cater for gifted and talented students. Several assumptions underpin the honors program: (a) Even though their gifted potential was nurtured and shaped during their K-12 education, university life would provide a more thriving experience and opportunities to gifted students to prepare them to be effective leaders in their fields, (b) a fundamental gap existed between the potential and eminent giftedness for young adults, (c) students would interact with like minds at university, and benefit from CI interactions, and (d) undergraduate life is a period of life to prepare gifted students to be socially effective individuals as they approached entering the workforce with diverse groups, and presumably to lead the response to changes and challenges in society. Thus, gifted programs in higher education institutions should aim to empower gifted students and capitalize on the concept of CI for diverse groups of people to effect changes that would benefit society. Therefore, honors programs for gifted students would be an

important element of any university that aimed for a high return on investment from gifted individuals, wished to improve the ranking of the university, and wanted to attract top-tier talent from K-12 education.

The proposed honors program aims to improve gifted students' soft skills, empower them to be active leaders in their respective domains, and capitalize on other students' talents to solve real challenges. The program was structured around three main themes: (a) an honors club that attracted talented individuals from various colleges and faculties through a rigorous identification program, (b) provide personal development opportunities based on gifted students' interests and workforce needs, and (c) integrate collective minds and intelligences to solve real-life problems.

In the first component, students undergo a thorough identification phase before being nominated for the honors club. If they are selected, they must sign an affiliation agreement to become a member of the honors program. This agreement specifies students' roles and responsibilities: being proactive members in attending program activities, being a member of selected projects in and off campus, and being committed to the values of the honors program, which include respect, collaboration, dedication, honesty, and transparency. Students affiliated with the honors program must achieve 100 points throughout the year in two major activities: personal development (30 points) and project development with other team members (70 points), one point being roughly equivalent to at least one hour of activity. The affiliation is valid for one year, and a renewal of membership for another year would be considered by a performance review panel based on the student's engagement in the previous year.

In the second component, the personal development program, students were offered various training sessions, courses, contests, orientation, hackathons, seminars, and boot camps during the academic year to improve their personal skills. These training sessions include various activities, as shown in Table 3, where

each session is given a score based on the amount of time spent on it. For example, if the session is two hours long, two points would be assigned to that activity. If the session required more working hours outside the session, additional points were given. Students should achieve at least 30 points in this component.

Table 3: Number of activities offered in various domains to students in the honors program

Type of activity	Domain	Number of events	Example
Honors program	Club orientation	5	Introduction to honors club, rules, regulations, receptions, networking
Lectures	Awareness	4	Innovations, talent development, intellectual property
Courses & workshops	Creativity	7	Design thinking, creative thinking, CPS
	Personal development	20	Leadership, project management, emotional intelligence, AI, leading change, team building
Boot camps	Innovation	5	Contest for innovative solutions in various industries: PepsiCo, social innovation, marketing and outreach
Hackathon	Problem solving	5	COVID-19, computers recycling, orphans care
Projects	Multidisciplinary projects	10	Podcast channel, innovation awareness campaign, talent platform, idea management platform

The third component, a development project, was intended to have gifted students work together collectively in a multidisciplinary way to develop

a wider perspective of teamwork, solve real-life problems, and innovate solutions. Three main elements were considered in terms of the project:

planning (10 points), development (40 points), and execution (20 points). For each project, a supervisor was assigned to mentor and support the team administratively. Based on students' interests, each team chose a leader and co-leader for their project. The project team would meet with a panel of experts every two weeks for feedback, encouragement, raising expectations, and a project progress review. Finally, based on the group's performance and the minimal viable product [MVP] developed, students were scored by the project supervisor and reviewed by the honors program committee. Students were required to achieve 70 points in total through proactive participation in at least one project. Based on students' scores across various activities throughout the year, they were awarded a total score for their participation. Gifted students were offered a one choice of 10 projects to participate in during the academic year. Students who achieved 85 points or higher were given certificates of completion.

3.3 Instruments

A survey was developed to determine students' perceptions of the honors program. This online survey consisted of 41 items along five dimensions to elicit students' responses regarding

elements of the honors program (i.e., OS: satisfaction, PQ: program quality, M: motivation, C: creativity, and L: leadership). The first dimension was related to honor's program quality, which mainly rating students' satisfaction of what was being offered, and how it was offered to them. Motivation was assessed based on gifted students' desire to participate in the program, enthusiasm, commitment, acceptance of challenge, and recognition. Creativity was assessed using items pertaining to the development of concepts and skills of creativity. Leadership construct was assessed based on items related to leading self, leading others, and development sense of community. Experts in education validated the survey during several rounds. Overall satisfaction (OS) was star rated (1–10 stars). The other dimensions, PQ, M, C, and L, consisted of 10 items each. For these dimensions, participants were asked to rate their level of agreement with statements regarding the impact of the honors program on a 6-point Likert-type scale (6 = strongly agree, 5 = agree, 4 = somewhat agree, 3 = somewhat disagree, 2 = disagree, and 1 = strongly disagree). The reliability estimates for each scale, as indicated by Cronbach's α , are presented in Table 4.

Table 4: Reliability estimates of the scales

Scale	Number of items	Cronbach's α
Overall scale	41	.98
Program quality	10	.93
Motivation scale	10	.91
Creativity scale	10	.96
Leadership scale	10	.94

3.4 Procedure

3.4.1 Data Collection

The data were collected during the fall semester of 2019, after the end of the first year of the

proposed honors program. Students who had joined the program were sent an online survey to reflect on their experiences during the program. Note that only around 50% of them responded to the survey. Completion of the surveys was

voluntary and confidential. The participants consented to the use of their data for research purposes.

3.4.2 Data Analysis

Three sets of analyses were used to answer the research questions. In the first set, one set of t-tests was employed with a criterion of 70% for each dimension to assess gifted students' reaction to the program across the four dimensions, serving as a quality reference for each dimension in the current study. The criterion of 70% was an arbitrary cut-off score for the first round of honors program implementation. The intention was to increase the cut-off score yearly, after taking corrective actions based on the feedback from students. The researcher tested the non-directional null hypothesis that average rating scores in the four dimensions were equal at 70%. In the second analysis, the author investigated the differential contribution of all items to satisfaction. All items were predictor variables, while satisfaction was the criterion variable. A stepwise, multiple linear regression model for categorical data was employed to specify significant items that contributed to overall satisfaction. The author tested the null hypothesis that there was no relationship between satisfaction and individual items on the survey. For all analyses, Cronbach's alpha was specified at the .05 level to control for type I errors, while type II errors were controlled at $(1-\beta) = .80$. Although the sample size was relatively small, power analysis was used to ensure the sample size was sufficient across all analysis. The third analysis was the qualitative question, and the author used the case study analysis method to answer the last question.

4. Results

4.1 The Impact of the Honors Program

Students' perceptions of the program's quality were significantly higher than the criterion score (70%). The one-sample t-test revealed a significant difference between students' average rating scores and the reference average rating score [$M = 83.27$, $t_{(58)} = 6.52$, $p < .001$]. This indicates that students' average perception of program quality was higher than the expected score. The effect size was high, as shown by Cohen's $d = .85$. Regarding students' perception of their motivation, the results show that their motivation was significantly higher than the reference score. The one-sample t-test revealed a significant difference between students' average rating scores and the reference rating score [$M = 85.86$, $t_{(58)} = 8.86$, $p < .001$]. This indicates that students' average perception about their motivation was stronger than the reference score. The effect size was high ($d = 1.15$). For creativity, students' perceptions about it were significantly higher than the average of the reference score. The t-test revealed a significant difference between students' average rating scores and the reference rating score [$M = 79.93$, $t_{(58)} = 4.51$, $p < .001$]. This indicates that students' average perception of their creativity was higher than the 70%, and the effect size was medium ($d = .59$). As regards leadership, students perceived their leadership skills were significantly different than the average of the reference score. The t-test revealed no significant difference between students' average rating scores and the reference rating score [$M = 73.76$, $t_{(58)} = 1.85$, $p = .24$]. This indicates that students' average perception score about their leadership was neither higher nor lower than the expected score. The effect size was small relative to other dimensions ($d = .24$).

Table 5: Analysis of average rating scores of dependent variables (N = 59)

Subscale	Mean (SD)	Difference	t	p	d	1- β
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Program quality	83.27(15.62)	13.27	6.52	.000	.85	1.00
Motivation	85.88(13.77)	15.88	8.86	.000	1.15	1.00
Creativity	79.93(16.92)	9.93	4.51	.000	.59	.94
Leadership	73.76(15.62)	3.76	1.85	.070	.24	.37

4.2 Important Factors in the Honors Program for Gifted Students

To determine the important factors of talented students' satisfaction with the honors program, a stepwise multiple regression model for categorical variables was applied to the students' ratings of satisfaction. Only 7 of the 40 items were found to be significant predictors, explaining around 75% of the total variance [$R^2_{Adjusted} = .754$, $F(7, 51) = 26.46$, $p < .001$] in

overall talented students' satisfaction with the honors program. As indicated by the partial correlations, the seven items individually contributing from 27% to 48% of the overall variance in satisfaction. As shown in Table 6, the factors contributed most include three items in the leadership dimension (L8, L1, and L1), three items in program quality (Q6, Q4, and Q10), and one item in the motivation dimension (M10).

Table 6: Multiple regression analysis of how items predicted talented students' satisfaction (N = 59)

Rank	Items	β	t	p	r	r_p	r_{pt}
1.	L8 Being a member of an honors program helped me network in my university	0.360	3.918 ^f	0.000	0.49	0.48	0.26
2.	L1 I developed many personal and life-long skills in the honors program	0.377	3.463 ^d	0.001	0.70	0.44	0.23
3.	Q6 I felt that my opinion was accepted and respected within the honors program	0.310	2.764 ^b	0.008	0.72	0.36	0.18
4.	Q4 I felt satisfied in the talent development initiative	0.324	2.578 ^d	0.013	0.76	0.34	0.17
5.	Q10 The honors program was appealing and very attractive in my university	0.146	2.012 ^a	0.049	0.41	0.27	0.13
6.	L10 I developed my skills in teamwork	-0.24 9	-2.25 9 ^a	0.028	0.45	-0.30	-0.15
7.	M10 The project I enrolled in was very challenging	-0.23 8	-2.45 5 ^a	0.018	0.31	-0.36	-0.16

a: $p < .05$; b: $p < .005$; c: $p < .0005$; d: $p < .01$; e: $p < .001$; f: $p < .0001$

4.3 The Impact of Collective Intelligence (CI)

The CI of gifted students in the honors program yielded positive results on several occasions. In many challenges, gifted students formed teams of

three to five students to think collectively about solutions for various real-life problems. During hackathons and contests, several innovation sessions for challenges were developed by teams reveling in finding creative solutions. For instance, during a COVID-19 challenge introduced by “Hack of Sweden,” students proposed solutions during the lockdown for reaching high-risk people and attending social engagements, while maintaining social distancing via applications supported by technology. In a domestic challenge for an orphan’s charity organization, gifted teams proposed solutions to address the social and emotional needs of orphans by proposing a schoolteacher who could act as a virtual father to support the needs of the orphans. Although these challenges were diverse, the purpose was to mobilize gifted students from different colleges and talent domains to think collectively in solving real-life problems. Real evidence of the effectiveness of CI came from external organizations or panels when they interacted with our students.

Injaz Saudi Arabia (ISA), for instance, awarded two teams, mostly consisted of gifted students from our honors program, in a national level competition in 2020. ISA is a national, non-profit organization with the objective of empowering youth in leadership, entrepreneurship, and enhancing their economical, business and life skills. It engages volunteers from the private sector to invest their time and share their experience with our youth to better prepare them for the labor market and enhance their professional skills (Injaz Saudi Arabia, 2020). In a partnership with PepsiCo International, Injaz hosted a national level contest to empower young Saudi women in entrepreneurship. Four national universities participated in this contest, which involved six proposed startup companies. Two finalist teams of students from our university competed in this contest for innovative healthy snacks and foods,

and were awarded first and second place respectively. Furthermore, one gifted student was recognized as the best leader in the contest. The two teams involved 10 gifted female students, 7 of whom were enrolled in the honors program, and representing various disciplines, including science, engineering, business, art, and humanity. They outperformed more than 500 students in this national competition. ISA’s CEO sent a letter to the university president stating:

The participating female students from your university achieved exceptional results in the competition among other universities, the challenge was to find innovative solutions in nutrition and packaging. Impressively, as your university teams achieved the following ranks: (a) VIRDIS startup at first place and received a financial prize of \$10,000 for the development of their project, (b) SuCo KSA startup at second place and received a financial prize of \$6,000 as support for the development of their project, and (c) one of the female students won the Women’s Leadership Award. This was one of five prizes in total offered within the competition.

5. Discussion

The purpose of this study was to assess the effectiveness of the proposed honors program in developing gifted and talented students’ soft skills and CI to provide constructive feedback for improvement. Furthermore, it was intended to determine the important factors that contribute to students’ satisfaction, as there were very limited programs for gifted and talented individuals offered in the higher education setting in Saudi Arabia. The aim was to keep students engaged in such programs, maintain their motivation, address their desires and needs, and prepare them to develop innovative solutions to real-life challenges. The results confirm that the honors program had achieved a positive impact on students’ satisfaction, their perception of the program’s quality, motivation, creativity, and leadership. Although the magnitude of the effect

across these dimensions was recorded at various levels, the honors program had proved its effectiveness in various outcomes.

5.1 Soft Skills Development

An important impact of the honors program was students' perception of program quality, satisfaction, creativity, leadership, and motivation. The author hypothesized that no significant difference would be found between those dimensions and the criterion set in this study (75%). The findings show that gifted students' perceptions exceeded the criterion set for all dimensions, except satisfaction and leadership. The average rating scores were around the expected value set as a reference. A possible interpretation of those results relates to the launch of the new honors program in the university, reflecting that there are many opportunities to improve the program based on student feedback. This result was expected and indicates there are areas to be improved. For leadership, the result was also expected, as only a limited number of students enjoyed the opportunity to lead teams. Not all students had practical experience with such skills, although they had received training in leadership. However, training is different when practicing such skills under the supervision of a leader. The pattern of the results was consistent with the meta-analysis findings of Kim (2016) and Hattie (2009) regarding visible learning studies. The findings indicate that students improved their soft skills in the program, had a strong motivation to fulfill its requirements, and were satisfied with their experience, albeit not highly so. These results were expected due to the intensive demand, training, and structure of the program, with high expectations and need for student flexibility. Students were required to complete 100 hours of various activities during the year. Students experienced the program requirements as overwhelming, as they were pushed out of their comfort zone into a challenging program with high academic demands. This feedback could

help the design team improve the quality of the program in future versions based on the feedback students provided. Students had onerous working hours in various activities of their choice in diverse fields, such as creativity, innovation, entrepreneurship, leadership, and working with like-minded students on challenging projects. Moreover, they were taught and supervised by higher education professors and experts in the applicable fields. Thereafter, the results demonstrated acceptable levels of students' perception, although there is always room for improvement.

There were several limitations concerning the findings of this dimension, as no comparison groups or random assignments were employed in this study. The arbitrary reference score was based on the author's judgment, reflected in the acceptable satisfaction of 75% for the newly introduced program. Despite these limitations, the results suggest the program is to students' satisfaction. Much work remains to be done to fully determine the best practices for higher education programs for gifted and talented students, to establish ways to enrich students' experience, and to prepare them as leaders in their fields and talent domains. For instance, an experimental design to measure the effectiveness of honors programs for equivalent groups might reflect a clearer picture about the program—a structured program parallel to students' undergraduate degrees is of high interest to many universities. Moreover, a systematic approach to identify students' talents based on performance is important in a university context.

5.2 Factors that Matter to Gifted Students in the Honors Program

In determining the important factors that contributed to gifted students' satisfaction with the honors program, the findings show that about 75% of students' satisfaction can be attributed to seven items: three pertaining to the leadership dimension, three related to program quality, and

one related to motivation (see Table 6). The results indicate that soft skills were an important dimension in the honors program, as well as the affiliation with the honors club that brought prestige to students and recognized their talents. The pattern of the results in the current study was consistent with the meta-analysis findings of Kim (2016) and Hattie (2009) in the visible learning study, and in alignment with previous work (Aljughaiman 2011; Aljughaiman & Ayoub, 2012; Chan, 2000, 2003; Fraleigh-Lohrfink et al., 2013; Gubbels et al., 2014). The results show that the intensive and structured honors program was highly effective in engaging gifted students and improving their soft skills, including leadership, creativity, innovation, and entrepreneurship. These essential soft skills seem important for gifted students, by empowering them and strengthening their ability to become effective leaders able to achieve results and establish corporate companies. The results also showed a strong correlation between satisfaction and the program's offerings, quality, and challenging assignments. One of the limitations concerning the findings of this dimension is that only 75% of students' satisfaction was explained by the seven items discussed above (see Table 6), while the remaining unexplained 25% variance might be beyond the dimensional scope of this survey. Despite these limitations, the results suggest gifted students are interested in leadership skills, a high-quality program, and challenging tasks and projects. However, the most important questions need to be answered are related to what is being offered, how it is offered, the context in which it is offered, and which cohort group it is offered to.

5.3 Collective Intelligence (CI) Outcome

One of the main intended results pursued in the current study was the power of CI for gifted students. As the qualitative results indicate, students from the honors program conceptualized innovative solutions in the competition sponsored

by PepsiCo. and were able to show effective problem solving in a challenge provided by the sponsor. Furthermore, the sponsor was willing to invest in their solutions and develop their minimal viable product into a commercial one through a business accelerator. It was highly challenging to have gifted students from various colleges and talent domains collaborate in finding a solution to a set problem, but it proved to work well indeed. The challenge lies in harnessing their different mindsets, interests, and thinking styles. However, with training, opportunities, good leadership, and supervision, the results of such collaboration could be outstanding. Because CI mitigates the effects of personal bias and provides diverse views, it can build greater solutions than the sum of individuals' solutions. Taping into CI is the best achievement an organization could achieve to benefit the business and ensure its longevity.

5.4 Implications and Recommendations

The results suggest several theoretical and practical implications. Theoretically, helping students achieve greater results by CI is a hallmark of the new era of thinking in business and the corporate environment. However, there are only a few conceptual frameworks that can guide theories and practices in this field. Researchers could examine models that integrate co CI in talent management programs to enlarge potential outcomes from gifted individuals. In practice, performance-based assessment is, in addition to previous testing scores and historical data, key to identifying gifted and talented students in higher education. Furthermore, it is important that gifted students improve the soft skills that will enable them to work effectively and collectively with people with like minds and average students to develop practical and innovative solutions toward prominent challenges they will face in life, school, and corporate business. Reports from many businesses explicitly emphasize the power of CI.

Thus, academic programs and undergraduate degrees must integrate this aspect of development to promote graduates' increased competitiveness.

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