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BRIDGING THE GAP: HOW LEADERSHIP SKILLS IN GRADUATES SHAPE THE LANDSCAPE OF INDUSTRY 4.0

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Abstract
Various scholars offer diverse interpretations of "leadership," encompassing perspectives on personality traits, relational influence, cognitive and emotional capacities, a character's alignment with the group, and the prioritization of individual versus collective interests. The definitions can significantly differ across these approaches. Motivation for undertaking leadership roles within universities or colleges is crucial for students pursuing graduation. While the development of leadership skills commonly occurs during adolescence, a notable trend suggests that students displaying a higher motivation to assume leadership responsibilities during their graduation years tend to acquire essential leadership skills demanded by the industry. Cultivating leadership early in life not only boosts self-esteem but also contributes to the development of a more mature adulthood.

Conversely, graduate students often encounter limited opportunities to assume leadership roles, and the models of adult leadership can be perceived as inappropriate by those in adolescence with leadership aspirations. This research focuses on students pursuing graduation, investigating their experiences and perspectives. A survey, with a limited participant pool, has been conducted to explore the implementation of Industry 4.0 (I4.0) and its influence on developing leadership skills aligned with current industrial needs, a focal point in the present study.

Keywords: Training, Leadership, Statistical study, Case study.

1.0 INTRODUCTION

Numerous scholars employ the term 'leadership' in diverse contexts, with approaches to behavioral influence encompassing considerations of personality traits, social impact, cognitive and emotional abilities, and group orientation (Koh et al., 1995). Descriptive and normative definitions exhibit variations in their emphasis on behavioral types, often conceptualizing leadership as a complex, multifaceted skill set rather than a fixed personality trait. This dynamic perspective underscores the view that leadership is a process susceptible to improvement through strategic initiatives (Yang, 2014). Academic discussions predominantly focus on the adult experience of leadership, contributing to a nuanced understanding of these concepts (Hochwarter et al., 2006 & Pierro et al., 2013). Exploring student opinions reveals a recognition of the importance of leadership both on campus and beyond college. Effective leaders are deemed crucial for

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organizational and societal success, influencing factors such as employees' job satisfaction, organizational commitment, and work performance (Zilembo et al., 2004; Heller et al., 2004 & Ozgen et al., 2013). Consequently, students' future career prospects hinge on their leadership abilities, which can be cultivated during their undergraduate years.Specific fields, such as nursing, engineering, and business administration, underscore the significance of student leadership, with a focus on leadership effectiveness and practices across various spectrums (White, 2004; Unsar et al., 2013). Analyzing personality traits and attributes of student leaders is crucial for understanding how they can enhance their leadership skills by embracing diversity.Leadership, as a subject of literature, is characterized by various attributes, emphasizing the need for influential leaders to adapt their skills and abilities according to the needs of their followers and the prevailing circumstances, ensuring a lasting impact on those they lead (Pierro et al., 2013). Examining leadership qualities reveals that leaders wield interpersonal skills to influence the perspectives, emotions, and actions of others, guiding and directing group performance. Studies, including meta-analyses, establish a connection between individual differences and leadership emergence or efficacy, supporting the leadership trait approach that posits leadership as a function of one's characteristics (Hogan et al., 2003). Successful leaders are believed to possess distinct physical and psychological factors that differentiate them from non-leaders.Studies in the context of Western culture highlight leadership attributes such as self-confidence, adaptability, visionary thinking, inspiration, and effective problem-solving as vital for future leaders in the Industry 4.0 era (Koh et al., 1995 & Mendoza et al., 2016). These attributes empower leaders to anticipate challenges and provide effective solutions, contributing to their efficacy in the dynamic landscape of Industry 4.0.

Aims and objectives:

Professionals have discussed mainly leadership. Youth leadership formation is extensively researched in academic literature, yet the factors that contribute to youth leadership should be more appreciated. Research on young people's experiences, as they transition into leadership jobs is scarce despite the research on leadership and leadership behaviors. This research aimed to find and assess the evidence foundation for the benefits of leadership applications for young adults in the literature on youth as leaders. Specifically, the content and methodology of programs will be aimed at helping young adults develop as leaders.

Industry 4.0 is a skill development method to recognize trained students to fulfill industrial entrepreneur and management qualities at the graduate level. Team-based work is presently needed for organizations to improve performance as well as quality output; students must be trained as a leader in such a way as to reach the goals of the industry. The present work focused on a leadership environment survey to check the base-level development in students and the root causes of self-improving activities in students and trainers.

2.0 Literature review

Chan (2003) performed a within-subject analysis in addition to comparing the research and control groups. Research and control groups were similar in pre-training measures of creativity

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and leadership. However, post-training results for the control group were omitted. Specific subjects improved divergent thinking, communication, and effective communication abilities. Effectiveness, collaboration, communication, and empathy were all improved, as were feelings of belonging, relationships with family and friends, the ability to make decisions and resolve disagreements, self-esteem, and self-belief (Gregoric *et al.,* 2008).

The experience of belonging to a community will have less effect (Hendricks *et al.,*2010). The program's participants said it improved them to gain new information, perspectives, and capabilities. As a result of enhancing their resolution process and communication skill, they gained the self-assurance and optimism they needed to take on new challenges and achieve their goals. According to their findings, leadership abilities, and behavior are improved significantly. It was found that the participants were more aware of the strategies to overcome limits and felt more robust and confident in leading in several ways after participating in the study by Dr.Naveen Prasadula (2023). The interviewer's previous job as a course instructor brought him into contact with this leadership training. In addition, the participants were asked to participate in a focus class discussion.

Wong et al. (2012), the intervention group's self-esteem and self-efficacy improved compared to the control group. In any event, the significance level of the differences between the two modifications must be revised. According to the authors, leadership knowledge and abilities increased among participants in Cohen et al. (2011). According to the findings, students must understand what it takes to be a successful leader before the course. This program had a positive impact on participants' leadership abilities and confidence, as well as an increase in their job prospects following its conclusion. In Said et al. (2013)’s study, focus groups, and survey responses were combined with information gleaned from the participants. Those who participated said they got a lot out of the system regarding knowledge and abilities they could utilize in their training conditions.

In the study by Cohen et al. (2012), the research group's attitudes toward people with impairments were much more favorable following the training than before. On the other hand, no variations between the experimental and control groups were found. Participants in Chen et al. (2009)'s study reported higher self-esteem, improved social skills, and a greater desire to solve issues. The most important factors to consider with IR4.0 are the difficulties of operating in a highly competitive market. Several challenges are raised by this new technology for enterprises. We must work because we will need to learn new skills and procedures. We have come a long way in tens of thousands of years, from the caveman and automobile to the airplane and computers (Rojko, 2017).

If it transitions to an information-based economy, India will require a new generation of highly educated and capable workers. As a result, its focus will be determined by how successfully its youth produce, offer, and consume knowledge. When developing a nation's economy, a knowledge economy expects India to be the leading source of essential skilled and scientifically literate professionals and technicians in the information industry. India needs a flexible educational system integrating fundamental training to establish a favorable learning environment—

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developing essential competencies and specialist knowledge via secondary and post-secondary education. Maintaining long-term learning requires specific strategies (Srivastava & Gambhir, 2018). Because of the rising percentage of undergrad unemployment, higher education must contain an incentive to develop aptitudes and skills relevant to the workplace. Individuals must also cultivate multiple skills, such as lifelong learning and dispositional mobility, for an unconventional future (Gabor *et al.,* 2019).

3.0 Methodology

Qualitative and Quantitative work for this study focuses on the skill development of graduates in leadership quality improvement as a case study. Researchers conducted this research to study how students who experience their parents' leadership skills can change others into those similar attributes.

Methods of training program related to I4.0

A total sample of 112 was finalized for the final output response analysis; in this 112, each student connected with five other college students, a sum of 560 graduates and a total of 672. the batches were divided into 112, and each mentor had eight to observe—14 mentors, 12 trainers, and two professors associated with the final study. The inter-communication skills observed in each team of 6 to select one as leader after training completion. Mentors also shuffled to examine the core objective training for students, one batch followed by two mentors in each training level. The effectiveness of trainers and mentors was also observed, with student satisfaction considered. After watching students, trainers, and mentors, the four perceptions among professor's perceptions were finalized for the present study. The rating is also given to the better student in the batch who can transform into a team leader after completing the training portion.

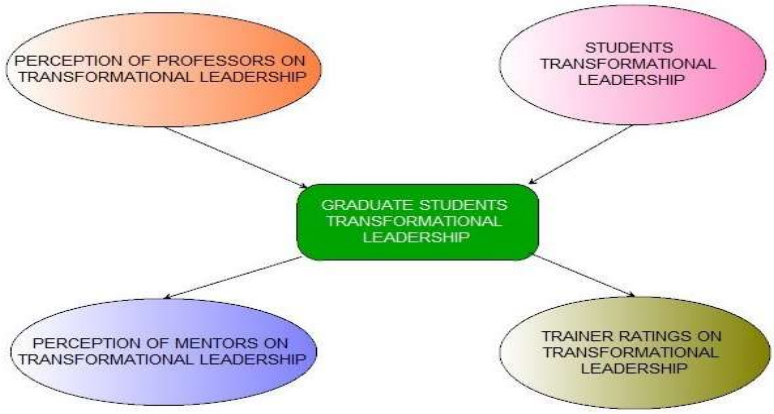

Figure 1. This model partially mediates Transformational Leadership Development in Students.

Students pursuing graduation in a team setting were shown to be more effective, gratifying, and effort-inducing when they used transformational leadership behaviors. It was attended by 112 recent college graduates (mean age 19 years). Student perspectives on professors' parental

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participation were gathered, as viewed on students' transformational leadership styles, evaluations of the same student from one to five other students, and an evaluation of the same student by a trainer. Only 112 individuals remained after weeding out those with incomplete data sets. The majority (57%) were 87 female pupils and 25 male students. Student participation averaged 19 years of age (SD range 16 to 22 years). A global scale was utilized instead of focusing on the individual components of transformative leadership because there were complicated relationships between variables in this investigation.

Table 1: Transformative Leadership Dimensional Self-Analyses of Students

Variable	1	2	3	4
Idealized influence	0.61			
Inspirational motivation	0.52	0.59		
Intellectual stimulation	0.60	0.49	0.77	
Individualized consideration	0.49	0.46	0.59	0.51

Table 2. Interco relations of graduates' Perceptions of Professors and Mentors Transformational Leadership Dimensions (N = 112)

Variable	**1**	**2**	**3**	**4**
Idealized influence	-	0.75*	0.74*	0.79*
Inspirational motivation	0.59*	-	0.71*	0.74*
Intellectual stimulation	0.63*	0.52*	-	0.70*
Individualized consideration	0.66	0.53*	0.67	-
Internal consistency (a), perceptions of Professors	0.57	0.48	0.80	0.67
Internal consistency (a), perceptions of Mentors	0.70	0.55	0.85	0.77

Finally, each graduate had to complete a self-rating and five student ratings to ensure the questionnaire was not excessive. Items were chosen for their applicability in a team sport setting and relevance to and comprehension by graduate participants. To test a latent variable model, the 12 variables were divided into two independent, 6-variable scales utilizing an odd-even split of the items for the scales evaluating perceptions of each Professor's and Mentor's transformational leadership.

Table 3. Student and Trainer Ratings of Transformational Leadership Dimensions of Respondents (N = 112)

Variable	**1**	**2**	**3**	**4**
POG idealized influence	-	0.52*	0.54*	0.54*
POG inspirational motivation	0.75*	-	0.69*	0.63*
POG intellectual stimulation	0.78*	0.74*	-	0.79*
POG individualized consideration	0.64	0.65*	0.76*	-

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Internal consistency (a), Student perceptions	0.78	0.81	0.78	0.63
Internal consistency (a), trainer perceptions	0.82	0.80	0.81	0.76

***Perceptions of graduates = Pog**

The statistics below describe how adolescents perceive transformative leadership. * p < .01.

In both cases, participants rated their own and their teammates' transformational leadership abilities using the MLQ's previously mentioned 12 criteria. Five participants were chosen randomly, and items were reworded to represent their and their teammates' impressions of their leadership conduct.

According to the study, participants were asked topics such as: "increased my willingness to attempt further" and "leads a team that is effective" on a Likert-type scale, where the responses ranged from 0 to 5. To better represent the organized sports scenario, we used a 12-variable version of the MLQ to quantify trainer judgments of student transformational leadership.

Table 4. An Analysis of All Study Variables' Descriptive Statistics and Inter correlation (N = 112)

Variable	1	2	3	4	5	6
Professor- 1	0.85	-	-			
Professor -2	0.90	0.82	-			
Mentors- 1	0.53†	0.52	0.76			
Mentors - 2	0.48	0.53	0.85	0.75		
TML- self	0.39†	0.45†	0.05	0.33	0.84	
TML - Student	0.27†	0.26†	0.02	0.16	0.21	0.93
TML-Trainer	0.05	0.09	0.04	0.05	0.28	0.27
Rating of effectiveness-Student	0.20*	0.18	0.03	0.13	0.27	0.78
Rating of effort- Student	0.21*	0.16	0.06	0.07	0.13	0.78
Rating of satisfaction-Student	0.26	0.23*	0.07	0.11	0.21	0.84
Rating of effectiveness - Trainer	0.03	0.08	0.05	0.03	0.26	0.77

***Transformational leadership =TML**

Students and instructors were challenged to evaluate the effectiveness of transformational leadership. Adolescents' transformational leadership does not directly influence student and trainer perspectives of the effects of transformative leadership in non-medicated models than in partially mediated models. Thus, the fully regulated and the non-mediated models look aligned within the partially mediated model.

Table 5: Standardized Parameter Estimates for the Measurement Model (N = 112)

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Variable	Trainer evaluations Results	Student evaluations Results	Transformational leadership	Perceptions of Professors' Leadership	Perceptions of Mentor's Leadership
Effect - Trainer	0.88				
Effort - Trainer	1.00				
Satisfaction - Trainer	0.80				
Effect - Student		0.73			
Effort - Student		0.94			
Satisfaction - Student		0.88			
TML - Self			0.49		
TML - Trainer			0.62		
TML - Student					
Professor - 1				0.92	
Professor - 2				0.91	
Mentor-1					0.94
Mentor- 2					0.91

Professors' transformational leadership was assessed using this method. A single indicator latent variable was used to perform all subsequent analyses on these two concepts. They focused on using numerous indicators to interpret our data more conservatively because both techniques yielded the same results.

Six latent variables were included in the suggested measuring model, including perceptions of mentor leadership, professor leadership perceptions, children's transformative leaders, student evaluations of results, Trainers' assessment of outcomes, and athletic competence. (70) 5 90.50 x2, not significant (ns), GFI 5.89, NFI 5.94, and the CFIC 5.98. Parameter values for the measurements model's estimation model are shown in Table 5.

The Fig. 1 diagram has been enhanced to include the perspectives of parents, trainers, and students on transformational leadership and their evaluations of the results. Children's transformative leadership was not connected to trainer and student assessments in the

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nonmedicated approach, but these extra connections were maintained. An excellent data match was found for our proposed mediational model x2 (75) 5 95.20, ns; GFI 5.89; NFI 5.93; CFI 5.98; and PNFI 5.67, which did not differ significantly from our partially mediated model x2 (71) 5 90.55, ns. As if that was not enough, the nonmedicated model had an x2 difference of (2) 5 2.12, ns fit the satisfactory data, but the partially mediated model had an x^2 difference of (73) 5 93.08.

Discussion:

A pre-implementation of the I 4.0 case study environment was observed in the present work by taking students, professors, and trainers into the survey. The findings of this study extend earlier research in the field of leadership development. First, this study shows that social learning may explain leadership growth. The amount to which graduates perceive their professors' employment of behaviors associated with transformational leadership in their interactions with them and the extent to which they display similar behaviors when their students are involved. As a further finding, the current research shows that transformative leadership practices apply to older adults. Graduates who demonstrate transformational leadership qualities inspire their students to concentrate and be considered fulfilling and effective leaders.

Conclusion:

This study investigated the most critical elements affecting a person's adaptability after implementing education designed to improve one's abilities at higher and technical levels. Skills education or training is essential in today's fast-paced environment, where technology constantly evolves. The rigid structure of institutions of higher learning must give way to one that is more open and flexible. The findings from this study allow us to understand the development of leadership in teenagers and the role of transformational leadership. According to these results, there is a direct correlation between the amount of transformative interaction between Professors or Mentors and their adolescent students. As a result of these discoveries, we may expand our concept of transformative leadership, including an apprenticeship approach in which we pass on the talents and lessons of great leaders to a younger population, a top-down approach. As shown in Table 4, perceptions of mentor and professor leadership behaviors have significant zero-order relationships. A post-doc analysis indicated that the views of mentor and professor transformational leadership predicted the transformational leadership behaviors of teenagers when examined separately. When mentors and professors are recognized as equal, students' perceptions of professors' transformational leadership organization the effects of mentors on transformational leadership. Future studies should determine whether these results are due to the relationship between the variables and ensure that gender Considerations can be eliminated. Professors' and Mentors' transformative leadership could be evaluated in future studies. In line with the Fourth Industrial Revolution, a modern educational framework must be introduced and implemented to bring education into the 21st century. Educators have a new challenge in preparing the next generation of leaders for the coming industrial revolution. The industrial needs to be satisfied at

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the graduate level before stepping out from the campus; communication and leadership quality at technical scope in this era is much appreciable.

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