



Supporting Engineering Education through Internship Mentoring Program: Approaches, Perceptions and Challenges

Amare Tesfie Birhan^{1*}, Tsehaye Alene Merso¹

¹Bahir Dar Institute of Technology,
Bahir Dar University, ETHIOPIA

*Corresponding Author

DOI: <https://doi.org/10.30880/jtet.2021.13.01.020>

Received 29th July 2020; Accepted 29th January 2021; Available online 31st March 2021

Abstract: University-industry linkage is considered as a strategy to equip university students, with theoretical and practical knowledge. The purpose of this research was to investigate the approaches, perceptions, and challenges of internship mentoring in Bahir Dar Institute of Technology, Bahir Dar University. The participants were mentors, students, and a director. Thus, 60 mentors, 80 students, and one academic program director were selected through availability and purposive sampling techniques. The research was designed through a case study, embedded mixed research design approach. The data were collected through questionnaire and interview and analyzed through descriptive statistics (mean), the Kruskal-Wallis H test, and thematic analysis. The data revealed that both mentors and students perceived internship mentoring helped to improve engineering students' academic achievements and their psychology. However, different responses were observed between mentors and students. Most students did not perceive the internship mentoring program helped them improve their communication skills and their future careers. The data also proved that majority of mentors used a cloning model than the nurturing and friendship models. Finally, the data indicated that lack of company supervisor's interest to involve students in the actual work, inadequate support from administrators, and inadequate guidance for mentoring are the major challenges that affect the implementation of internship mentoring in Bahir Dar Institute of Technology, Bahir Dar University.

Keywords: Internship mentoring, academic achievement, psychology development, future career, mentoring approach

1. Introduction

Mentoring is an effective strategy in adult education, industries, and business sectors. Mentoring helps to share working experiences and facilitate students learning. Duquette (1998) point out that students maximize their learning and develop professional practices while they are counseled and advised by experienced mentors. It plays a prominent role in industry, culture, and education. Mentoring includes assisting students' learning by experienced and trusted advisors (Riskin, Ostendorf, Cosman, Effors, Li, Hemami & Gray, 2004). Mentoring has a long history (Rosemary, Ekechukwu & Horsfall, 2015). Historically, mentoring linked in Greek mythology, Odysseus, a friend of Ulysees asked to watch over and mentor his young son (Bird, 2001; Pisimisi & Ioannides, 2005; Agholor, Lio & Serrano, 2017). Since then, mentoring and advising have been using in teacher education, management, and the medical professions (Eby, 1997; Duquette, 1998; Demir, Demir, Bulut & Hisar, 2014). Mentoring was started in education in the 1980s (Retallick & Pate, 2009), and it has been implementing in public and private universities. Retallick and Pate (2009) mentioned that mentoring is successful if it is implemented effectively with clear objectives, mutual consent, and open dialogue, and it has also a potential effect to enhance academic, career, and psychological development of both mentors and students.

Based on Zone of proximity development, learners could improve their learning with the support of adult guidance or in collaboration with capable peers. Mentoring is an act of assisting learners by capable peers and adult's guidance to

maximize the students learning in professional and career domains (Srivastava & Jomon, 2013; O'shea, 2014). It is an effective strategy to transform students' knowledge into practical aspects, to coup up in a new environment, and to socialize with other students. Similarly, Birhan and Chekol (2019); Kendrick, Nedunuri and Arment (2013) and O'shea (2014) explain that mentoring is an effective strategy to enhance students learning, to assure quality education, and to treat students who have difficult behaviors. It also helps to reduce the student's anxiety, provide a positive learning environment, and boost self-confidence and lesson confusions (Dennison, 2010).

Learners like to be assisted with trusted mentors who have impacted their learning. Consequently, mentors should have intelligence, integrity, ability, professional attitude, high personal standards enthusiasm, and willingness to share accumulated knowledge, to achieve career and psychological function and to be trusted by the students (Abiddin, 2006). Furthermore, Kram (1985) and O'shea, (2014) mentioned that mentoring in career function, include coaching, sponsoring career advancement, and create positive exposure and visibility and challenging assignments. It also includes psychological functions such as developing identity, self-worth, and self-efficacy by providing counselling, and friendship. Researchers such as Buell (2004); Ratnapalan (2010) identified different approaches to mentoring communication. These include cloning, nurturing, friendship, and apprentice mentoring models (Switzer, 2010, Ratnapalan, 2010, Meeuwissen, Stalmeijer, & Govaerts, 2019). In the cloning mentoring approach, mentoring is performed in a controlled way (Buell, 2004). The friendship approach is more focused on collaborative work. Ratnapalan, (2010) indicated that friendship occurs when students and mentors are close; whereas, apprentice mentoring approach follows their hierarchy. The mentor trains the students what the mentors knew and learned. However, the nurturing approach creates a safe environment, and students share their personal life and work experience, and see things by themselves. According to Ratnapalan (2010), in nurturing approach "the mentors' role is as facilitator and act as a resource" (P.198).

Currently, by assuming the above importance, industries, higher institutions, and other industries design and implement mentoring programs. Higher institution students are mentored to get work experience in their internship, to be creative, adaptive and to be aware of the real-world environment after graduation. According to Wronka (2013), universities have the role of educating the workforce with specific qualifications and skills, preparing students to take on a new role in life (both social and professional). This vision is achieved through required skilled, knowledgeable, responsible, and civic-minded citizens. Hence, to have such kind of citizen, students learning should be mentored and facilitated through proper, strategic mentoring practices and experienced practitioners. Snowden and Hardy (2012) also argued that mentoring at the higher institution helps to encourage participation with the academic community, to promote a sense of belongingness, to use resources, and to build positive behavior. The internship program helps a lot for both interns and host organizations (Ismail, 2018). Advising and feedback which students found at university instructors play a great role in students learning development, for better recruitment and retention programs that address the academic, social, and psychological needs of the learners (Kendricks, Neondunuri & Arment (2013).

1.1 Internship Mentoring in Engineering Discipline

Theoretical and empirical studies indicated that internship has positive effects in engineering education. Engineering and technology students learn to gain a lot of experience from different approaches. Particularly, the internship program is crucial to have a work-based experience in students' filed. According to Thompson (2014), employers within industry and technology require candidates who have internship experience. Currently, it is known that getting a degree is not good enough for students' to get a job; they need real and industrial experience. The students get industry experiences in a limited time (Maertz, Stoeberl, & Marks, 2014). Hence, internship program plays a great role for them to have work based experiences. Hence, they must be assisted to get the expected work based experience in the internship mentoring.

Internship program creates an authentic environment that does not occur in students' classroom. Besides, internship program helps engineering students to acquire a new concept and idea that does not cover in classroom instruction. According to Marsono, Sugandi, Tuwoso, and Purnomo (2017), internship is provided to get real experience of what to work in the industry so that they are ready to work after they graduate and to have knowledge and experience about industrial work practices. Furthermore, internship mentoring is crucial to dealing with stressful and difficult periods in their graduation carrier, to secure professional placement, to lower stress, and build confidence and engagement in their field of study (Michigan University, 2011). Besides, engineering students need to improve their communication which they will use during education and in their future work. According to Salzman and Strobel (2011) and the National Academy of Engineering (2004), engineering in the 21st century requires more than just strong technical and analytical abilities, but they also need the ability to communicate work as a team.

Thus, universities have to develop a wide variety of programs to help students enhance communication and leadership skills and to solve problems working with people outside the engineering program (Salzman & Strobel, 2011). Similarly, it is mentioned that university education should consider the environment and the needs of the world of work (Marsono, et al. 2017). Therefore, learners should be ready educationally and psychologically to meet the global market demands through proper assistance and guidance. However, currently, it has also been observed that governmental and non-governmental industries are frustrated to hire new graduates as a result of a lack of required skills, experiences, and communication abilities. Accordingly, in Ethiopia, universities plan to reintroduce the practice

of internship mentoring before the final year of their undergraduate study and assign students to sectors related to their field (Ministry of education, 2018). Therefore, to achieve the above-mentioned internship objectives, the internship should be led through clear guidelines to enhance engineering graduates' academic and soft skills, to prepare them in future work, and to transfer what they are mentored, learned and to create new knowledge.

Mentors have a great responsibility to advise, counsel and assist the engineering graduates. Researchers such as (Marsono et al., 2017; Hardie, Almeida & Ross, 2018; Ozek, 2018) confirmed that individuals who are mentored perform better and are prompted rapidly because they have learned and gained knowledge from their mentors. Mentoring requires a clear system to follow and evaluate the application and implementation of mentoring. Mentoring has a commitment that facilitates sharing guidance, experience, and expertise. Students should also have a chance to evaluate their mentor regarding their assistance. These could also have a significant impact on students' academic performance, communication skills, quality education, students' future career, and psychological development. However, Berk, Berg, Mortimer, Walton-Moss, and Yeo, (2005) stated that Engineering and technology internship mentoring are challenged by various factors, and these are related to mentors, students, and institute related factors. These researchers mentioned that there has been lack of clarity about the characteristics mentoring relationship; there were no clear strategies which were used by the institute, mentors, and academic program officers to introduce the students to the right people who had experience in assisting, guiding and mentoring.

Recently, some researchers studied the internship program and internship mentoring. To mention, Kaul, Ferguson and Yanik (2019) studied the impact of leveraging peer mentorship and vertical integration in a project-based learning environment, and reported that the program helped students to improve their academic achievement. Brush, Hall, Pinelli and Perry (2014) also studied interns and mentors' knowledge and skills and perceived importance of these skills in engineering and science careers; the researchers reported that the internship mentoring program is helpful to gain written and oral communication skills, decision-making skills, collaborative work, innovation, time management, critical thinking, and technical skills. Zerihun (2019) also studied the challenges facing in the internship program. The researcher reported that inadequate guidance support, funds, and lack of enough time are the major challenges of the internship program. Likewise, Sisay and Eshetie (2018) conducted a study on the impact of internship programs on engineering and technology education. The research found out that lack of strict placement procedures, limitations of academic mentorship, and poor supervising practice in the industry are the major challenges of the internship mentoring program.

Thus, this research was aimed to examine perceptions, approaches and challenges of internship mentoring. Though previously mentioned studies discussed challenges and impacts of internship mentoring, they did not address the approaches, mentors and students perceptions; their focuses were different from this research. Therefore, this research was conducted in light of research works on internship mentoring program. The researchers hypothesized that internship mentoring does not considered seriously by mentors and students as a result of their perceptions and challenges.

1.2 Research Objective

The general purpose of this study was to explore the approaches of internship mentoring to support engineering and technology education, and it also aimed to investigate mentors' and students' perceptions and challenges to implement internship mentoring. Based on this objective, the following research questions were formulated.

- i. What are the approaches of internship mentoring in Bahir Dar Institute of Technologies?
- ii. How do mentors and students perceive towards internship mentoring program?
- iii. What are the major challenges which hamper the successful implementation of internship mentoring?

This research yields a lot of contributions for mentors and students for the successful implementation of internship mentoring in the institute of Technologies.

2. Methodology

2.1 Research Design

The main purpose of this research was to examine the internship mentoring program approaches and to investigate the students' and mentors' perceptions, and mentoring approaches to implement internship mentoring. Hence, this research is a case study research. The research considered both qualitative (interview) and quantitative (questionnaire) approaches in which they were collected simultaneously through embedded research design (Creswell, 2012).

2.2 Research Setting and Participants

This research took Bahir Dar institute, Bahir Dar University as a case study. The institute is one of the oldest Engineering and Technology institutes in Bahir Dar University, Ethiopia which graduates students in engineering and technology disciplines. The institute has a direction that every student who learns in engineering and technology department has a responsibility to work eight months in the industry and service centers.

In the institute, there are five (5) faculties such as faculty of chemical and food engineering, faculty of civil and water resource engineering, faculty of computing, faculty of electrical and computer engineering, and faculty of mechanical and industrial engineering. These faculties accept students in the regular, distance, extension (weekend) and summer program in the first degree (BSc), second degree (MSc), and third-degree (Ph.D) programs. The institute assigns 3rd year computing and 4th year engineering faculty students to spend 4 (four) months in the industry and service centers.

The purposes are to improve the practical skills and upgrade the students' theoretical knowledge, improve team playing and the leadership skills, improve entrepreneur skills and interpersonal communication skills. Besides, it aims to create awareness of industrial work ethics and industrial psychology. Particularly, all faculties' students except computing faculty students engaged in their internship program from September to January/march, and computing faculty students in the summer program (June, July, and August). In each program, one mentor is assigned for 5-15 students to follow, guide, and assist students while they are in the internship program. Accordingly, in this research, 60 mentors, 80 students, and 1 academic program director participated; students and mentors were selected through availability sampling technique and the program director was selected through purposive sampling. The students have mentors who are assigned to facilitate, advice and guide them in the internship program.

2.3 Data Gathering Tools

The main purpose of this research was to explore the approaches of mentoring, mentors' and students' perceptions, and challenges that hamper to the effective practice of internship mentoring in Bahir Dar Institute of Technology, Bahir Dar University. The researchers considered a questionnaire and interviews to gather the required data. Particularly, the questionnaires were aimed to gather data from students and mentors, and they were scaled with 5 Likert scales (5=strongly agree, 4= agree, 3= no idea/neutral, 2= disagree and 1=strongly disagree).

The items covered issues about participants' perceptions regarding internship mentoring program for academic achievement, psychological development, communication skills, and future job opportunity, and they also discussed how mentors approached their mentoring and the main challenges which impact the effectiveness of internship mentoring in Bahir Dar Institute of Technology, Bahir Dar University. The questionnaire items were adapted from previous studies by Kendricks, Nendunuri and Arment, (2013) Demir, Demir, Bulut and Hisar, (2014). In order to check the validity of the instruments, the items were reviewed by four Engineering and technology instructors who have more than 10 years of teaching and mentoring experience. Based on the comments given, revisions were made and administered for 20 students and 10 mentors, and the reliability of the instrument was checked through Cronbach alpha, and it was .864 and .774 which indicated the instruments were reliable. In this procedure, some questionnaires items which affect the reliability negatively were omitted.

The second method was a semi-structured interview. This tool was designed to gather data from mentors and the program director. Hence, some randomly selected mentors and the program director were interviewed regarding the practice of internship mentoring, perception on its importance; strategies which they use to evaluate the effectiveness and challenges that hamper the effective implementation of internship mentoring in the institute. These participants were chosen because they are responsible to follow and facilitate the internship mentoring program in the institute.

2.4 Data Analysis Methods

The data were analyzed through descriptive statistics, the Kruskal-Wallis H test, and thematic analysis. Particularly, the quantitative data were analyzed through descriptive statistics (mean & percentage) and the Kruskal test, and the qualitative data were analyzed through narrative. The Kruskal-Wallis test was run to compute if there were significant statistical differences across disciplines in mentors and students perception regarding the practice of internship mentoring. The significant was established for both Chi-square and Kruskal tests at $P < .05$. This test is used as a result of the following reasons. First, the variable is measured at the ordinal level (through likert scales). Second, the independent variable consists of more than two categorical or independent groups. Third there is no relationship between the independent variables.

3. Results

The results are presented thematically within three categories including approach, perceptions, and challenges.

3.1 Approaches to Internship Mentoring

The internship mentoring is observed according to the three mentoring approaches that incorporated the cloning, nurturing and friendship. Hence, the data were presented in the following way.

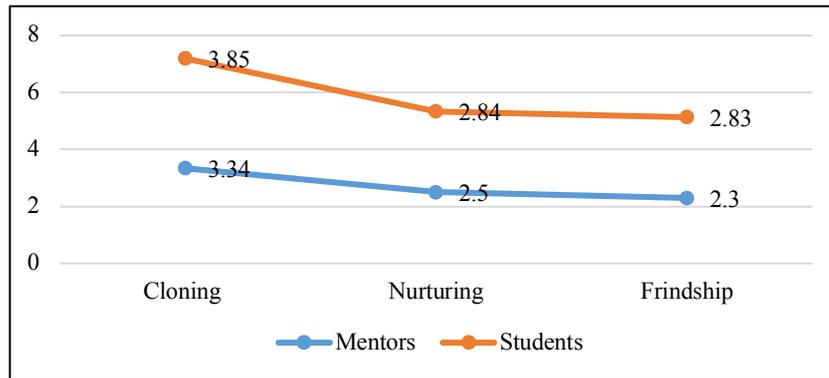


Fig. 1 - Internship mentoring approaches

According to Figure 1, most respondents (students mean =3.85 and mentors mean=3.34) mentioned that the mentors in the internship mentoring mostly used the cloning approach. The nurturing model is ranked at the second level (mean, 2.84, and 2.5). Besides, respondents ranked the friendship mentoring approach at the 3rd level. Hence, the data indicated that Bahir Dar Institute of Technology internship mentors dominantly used the cloning mentoring approach than the nurturing and the friendship approach. In the cloning mentoring model, the mentor assists his/her students to become like him/her with a directive/control way, and this model becomes disfavors and disuse (Buell, 2004).

3.2 Perceptions of Internship Mentoring

The other issue of this research was to determine the perception of mentors’ and students’ perceptions towards internship mentoring. As it is seen in figure 2, most mentors (mean=4.33) and students (mean=2.8) believed that internship mentoring helped learners to improve their academic achievement. The participants believed that internship mentoring is crucial to help engineering and technology students improve their academic achievements.

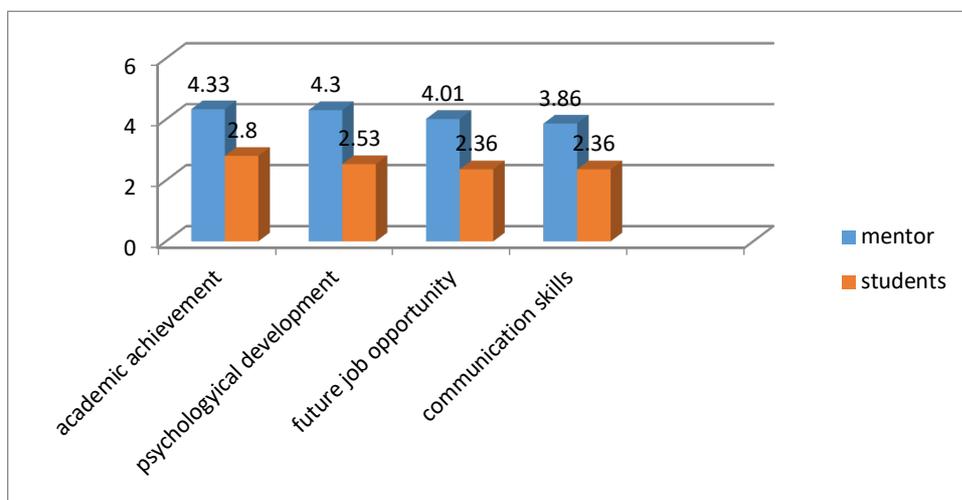


Fig. 2 - Mentors’ and students’ perceptions towards internship mentoring program

The second issue was mentors' and students' perceptions towards internship mentoring to manage psychological difficulties and to improve their confidence towards their education, and the internship program. Accordingly, most of mentors (mean=4.3) and students (mean=2.53) perceived internship mentoring programs helped engineering and technology students to manage their psychological difficulties and to improve their self-esteem and confidence during their education. The other issue was the perception of mentors and students on the internship mentoring program towards the students’ future careers. Hence, the figure showed that most mentors (mean=4.01) and a few students (mean =2.36) believed that internship mentoring could help students to create exposure and to get experience in the actual job that they are going to join after graduation. Accordingly, the data indicated that though mentors perceived internship mentoring is important to improve the students’ academic achievement, to manage psychological difficulties, to improve the students’ communication skills and to get exposure on future career, most students developed a negative perception regarding the internship mentoring.

Additionally, the Kruskal Wallis H-test was employed to observe if there were significant statistical differences among respondents in different faculties. According to Table 2, the Kruskal Wallis H-test result, $F(3) = 2.259, P > 0.05$, and $F(3) = .227, P > 0.05$ indicated that there was no significant statistical difference among mentors and students' response among mentor's perception in different disciplines to improve the engineering students' communication skills. However, different responses were observed between mentors and students among mentors in different faculties. The data indicated that there was no statistically significant difference ($F(3), df = 1.859, P > 0.05$) on internship mentoring regarding improving the students' academic achievement. In contrast, the data indicated students among faculties had reflected different response regarding internship mentoring improve their academic achievement. Accordingly, the data indicated that there was no significant statistical difference ($F(3), 4.509, P < .005$) in students' response among faculties.

Similar, different responses were observed between students and mentors among faculties. The Kruskal Wallis H-test result, $F(3) = 1.973, P > 0.05$ showed that there was not a significant statistical difference in mentors' response towards the internship mentoring program that helped to manage psychological difficulties during the students' education and in the internship program. In contrast, a significant statistical difference ($F(3) = 5.102, P < 0.05$) was observed in students' responses towards the internship mentoring program to manage the students' psychological difficulties among faculties. Hence, refereeing to figure 2, students in different faculties perceived that the internship mentoring is not important to manage their psychological difficulty.

The last issue was mentors' and students' perceptions of the internship mentoring program to get assistance and guidance on students' future careers. Accordingly, there was a significant statistical difference in mentors' response among faculties $F(3) = 5.749, P > 0.05$. Likewise, there was a significant statistical difference ($F(3) = 4.508, P > 0.05$) among students' responses towards internship mentoring that they perceived it helped students to get exposure for their future career opportunities.

Table 1 - The Kruskal Wallis H-test result of mentors and students' response

Kruskal-Wallis H test					
Items		df	Mean Square	F	Sig.
Communication Skills Improvement	mentors	3	1.689	2.259	.092
	students	3	.179	.227	.877
Academic Achievement	mentors	3	1.067	1.859	.147
	students	3	3.046	4.508	.006
managing psychology difficulties	mentors	3	.911	1.973	.129
	students	3	5.246	5.102	.003
Future Career	mentors	3	3.217	5.749	.002
	Students	3	3.046	4.508	.006

According to the data in Table 1, though mentors perceived internship mentoring is crucial for students' academic achievement, psychology development, future career, and communication development, different level of agreements were observed between students and mentors in different faculties except on the importance of internship mentoring for future career. Particularly, most students did not believe the internship mentoring program is important for their future career and communication skills improvement. This might happen because of the lack of mentoring practice that occurred in the selected institute.

Besides, an interview was conducted with mentors regarding their perception towards its importance. Accordingly, their responses are narratively presented. The first mentor mentioned that internship mentoring was very crucial especially for engineering students. According to this respondent, internship mentoring was crucial to teach students some practical aspects that could not be covered in classroom instruction. However, this mentor did not perceive internship mentoring was practiced the way it should be practiced. Similarly, the second mentor also reported that he perceived internship mentoring is crucial to improve the students' academic achievement, to enhance the students' communication skills, to manage the students' psychological difficulties and for their future career. He also believed that the actual practice was different from what his thought. He reported that students were sent to the internship program simply to fulfill the curriculum requirement.

Additionally, the third mentor also perceived the contribution of internship mentoring specially to get real work experience after graduation. However, he strongly expressed that the mentioned objective was only achieved if it was implemented properly. Lastly, the fourth interviewer ascertained that though internship mentoring is crucial; students who were sent for the internship program spent their internship period by engaging with unrelated tasks. According to

her report, some organizations did not trust students to engage them with real tasks and activities. She added that mentors did not visit students frequently, and this contributed to the lack of proper implementation of internship mentoring in the institute. Additionally, the program director also mentioned he did not think, internship mentoring is practiced properly.

In the above interview responses, the participants believed that internship mentoring is crucial to enhance their academic achievement and to get exposure to their future job opportunities. However, the participants did not believe it is practiced in the ways that achieve these objectives. Therefore, it is understood that all mentors who participated in the interview had a positive perception towards internship mentoring. They also confirmed that the mentoring program was not practiced as it was expected.

3.3 Challenges of Internship Mentoring

Table 2 - Challenges that impact effective implementation of internship mentoring

Items	Participants	Strongly agree (%)	Agree (%)	Neither agree nor disagree (%)	Disagree (%)	Strongly disagree (%)	Mean
Lack of mentors mentoring skills	Mentors	3.3	11.7	21.7	40.0	23.3	3.42
	Students	23.8	40	15	13.8	7.5	3.59
Lack of mentor's interest to follow up and assist students	Mentors	5.0	8.3	6.7	31.7	48.3	1.9
	Students	23.6	36.3	22.5	12.5	5.0	3.61
Lack of adequate support from the administrators (enough budget, transportation, and other facilities)	Mentors	35.0	33.3	11.7	11.7	8.3	3.75
	Students	28.8	45.0	12.5	8.8	5.0	3.68
Lack of company supervisor's interests to involve students in the actual work (giving tasks and responsibilities)	Mentors	28.3	66.7	5.0	-	-	4.2
	Students	27.5	60.0	12.5	-	-	4.15
Lack of adequate guidance for mentoring	Mentors	15	60	25	-	-	3.9
	Students	37.5	53.8	8.8	-	-	4.28

According to Table 2, most mentors (disagree=40% & & strongly disagree=23.3) mentioned that the lack of mentors mentoring skills is not a challenge to practice internship mentoring programs in the institute. Similarly, most mentors (strongly disagree=48.3 and 31.7 % disagree) stated that mentors' interest cannot be a problem to implement an internship mentoring program in the institute. In contrast, most students (40%=agree and 23.8% strongly agree) did not agree with the mentors' response regarding the mentoring skill. Students agreed that mentors mentoring skills are a challenge to implement the internship mentoring program in the institute. Besides, students (36.3 %= agree and 23.6% strongly agree) stated that mentors did not have the interest to follow and guide them during the internship program.

Majority of mentors (35% strongly agree and 33.3% agree) and students (45.0 % agree and 28.8% strongly agree) stated that lack of adequate support from the administrators (such as enough budget, transportation, and other facilities) is the major factor that affects the effective implementation of internship mentoring program in the institute. Likewise, both mentors (66.7 & agree and 28.3 % strongly agree) and students (60% agree and 27.5 % strongly agree) stated that lack of company supervisor's interests to involve students in the actual work (giving tasks and responsibilities) is a huge challenge for engineering and technology students to implement internship mentoring program effectively and efficiently.

The other issue was the lack of adequate guidance for mentoring. It was observed that both mentors (agree=60%) and students (53.8%= agree and 37.5 % strongly agree) agreed that lack of adequate guidance for mentoring was a major challenge for the internship mentoring program. Besides, most students believed that lack of mentors mentoring skills (mean=3.42) and lack of mentor's interest to follow up and assist students (mean=3.59) were also the challenges that affect the implementation of internship mentoring in the institute. However, majority of mentors did not accept these as the challenge; they perceived that they have interest and skill to mentor students in the internship program.

Mentors and the program director also mentioned during the interview that lack of transportation, lack of follow up by mentors and administrators, assigning mentors based on their interests without any screening criteria were observed challenges in the institute. Accordingly, the data revealed that lack of company supervisors' interest to involve students in the actual work (giving tasks and responsibilities); inadequate support from the administrators (enough budget, transportation, and other facilities) and inadequate guidance for mentoring are the major challenges of internship mentoring program in Bahir Dar Institute of Technology, Bahir Dar University. Besides, though there are discrepancies between mentors and students' responses, lack of mentors mentoring skills and interest to follow up and assist students are also regarded as challenges that impact the practice of the internship mentoring program in the institute.

4. Discussion and Implication

The purpose of this research was to examine the approaches, practices, and challenges of the internship mentoring program in Bahir Dar Institute of Technology, Bahir Dar University. Accordingly, the data revealed that majority of mentors and students mentioned that internship program mentors used the cloning approach more than the nurturing approach and the friendship approaches. This finding aligns with previous research findings by (Buell, 2004). However, the finding is contradicted with Retallick and Pate's (2009). Retallick and Pate observed that the cloning mentoring approach is implemented sometimes. In contrary to this research finding Meewissen, et.al (2009) reported most mentors used a friendship mentoring approach.

Correspondingly, the research indicated that both mentors and students had positive perceptions of internship mentoring. They perceived that internship mentoring is crucial to enhance students' academic achievement and to minimize or to handle psychological difficulties and to boost their confidence, and this finding aligns with previous research findings (Kram, 1985; Retallick & Pate, 2009; Demir, et al, 2014). Likewise, this research proved mentors perceived that internship mentoring helped students to improve their communication skills and to get guidance and assistance for their future careers. However, most students did not perceive internship mentoring helped them to improve their communication skills and for their future careers; this finding is contradicted with Retallick & Pate's, (2009) findings. Besides, according to the data, significant statistical difference was observed in mentors' and students' responses among faculties. Therefore, internship mentoring should be commonly implemented with specific and identified objectives. The research also indicated that lack of company supervisors' interest to involve students in the actual work, inadequate mentoring guidance and support from administrators are the major challenges that affect the effective implementation of internship mentoring in Bahir Dar Institute of Technology, Bahir Dar University; these were supported by previous (Sisay, & Eshetie, 2018; Zerihun, 2019) researchers stated that internship program was challenged as result of lack of interests, cooperation and availability of resources.

This research finding indicated a lot of implications on mentoring approaches, practices, and administrative issues. Firstly, mentors should know the appropriate ways of guiding and assisting students to achieve the designed objectives. There may not be one of the best approaches that mentors should apply during internship mentoring, however the approaches proposed will derive the basic concept of mentoring internship to integrate in engineering education program. Therefore, internship program mentors should use the approach that allows students to learn on their own, and they should create a close relationship to develop their students' trust. Secondly, mentors and administrators should train and inform students the significance of the internship mentoring program. When students have awareness of the internship mentoring program significance, they maximize their relationship with their mentors. Lastly, mentors, administrators, and other stakeholders should work closely to minimize the challenges that impact the practice of internship mentoring.

This study has certain limitations whereby this study has limitations given the time and constraints of factors faced by researchers. The data were collected only from only one institute mentors, students, and academic program director and it did not include specific organizations or company representatives. Therefore, future study is required by considering large samples and organizations. Secondly, further research is crucial to observe the effect of internship mentoring on students' academic achievement, psychological development, future career, and communication development through an experimental study.

5. Conclusion

This research was aimed at examining the internship mentoring approach, students' and mentors' perceptions and challenges that affects the implementations of internship mentoring in Bahir Dar Institute of Technology, Bahir Dar University. Accordingly, the data indicated that the cloning mentoring approach was dominantly practiced, and students' did not construct their knowledge and experience by themselves. The mentors directed them with labeled guidelines and experiences. Additionally, the data showed that there was observable perception difference between students and mentors regarding the importance of internship mentoring towards academic achievement, to improve communication, to manage psychological difficulties and to get exposure on future job opportunities. Likewise, the data showed that different challenges affected the implementations of internship mentoring in Bahir Dar institute of technology, Bahir Dar University.

Acknowledgement

The researchers would like to extend their gratitude for students and mentors who participated in this research. Additionally, we also gratefully acknowledge to Bahir Dar Institute of Technology instructors who reviewed and commented the instruments. We would also like to extend our appreciation to the reviewers who gave us constructive comments and suggestions.

References

- Abiddin, N. (2006). Mentoring and coaching: the roles and practices. *The Journal of Human Resource and Adult Learning*. Available at SSRN: <https://ssrn.com/abstract=962231> or <http://dx.doi.org/10.2139/ssrn.962231>
- Agholor, D., Á. Lleó de Nalda, and N.S. Bárcena (2017). *Mentoring future engineers in higher education: a descriptive study using a developed conceptual framework*. Production, (SPE)
- Berk, R., Berg, J., Mortimer, R., Walton-Moss, B., Yeo, T. (2005). Measuring the effectiveness of Faculty mentoring relationships. *Academic Medicine*, 80(1) 66-71
- Birhan, A. T. & Chekol, C. (2019). Fostering sport sciences students' academic achievement through peer oriented instruction. *Indonesia Journal of Curriculum and Educational Technology Studies*, 7(1) 1-10
- Bird, S.J. (2001). *Mentors, advisors and supervisors: Their role in teaching responsible research conduct*. *Science and Engineering Ethics*, 7(4), 455-468
- Brush, K., Hall, C., Pinellui, T., & Perry, J. (2014). Intern and mentors' Evaluation of workforce knowledge and the perceived importance of these skills in Engineering and Science Carriers. *ASEE Southeast Section Conference*. American Society for Engineering Education
- Buell, C., (2004). Models of mentoring in communication. *Communication Education*, 53(1) DOI: 10.1080/0363452032000135779
- Creswell, J. (2012). *Educational research: Planning, Conducting, and evaluation quantitative and qualitative research*. Pearson
- Demir, S., Demir, S., Bulut, H. and Hisar, F. (2014). Effect of mentoring program on ways of coping with stress and locus of control for nursing students, *Asian Nursing Research*, 8, 254-260
- Dennison, S. (2010), Peer mentoring: untapped potential, *Journal of Nursing Education*, 49 (6)340-342
- Duquette, C.,(1998). Perceptions of mentor teachers in school-based teacher education programs. *Journal of Education for Teaching*, 24(2), 177-179
- Eby, L.T. (1997). Alternative forms of mentoring in changing organizational environments: A conceptual extension of the mentoring literature. *Journal of vocational Behavior*, 51(1),125-144
- Hardie, G., Almeida, S., Ross, P. (2018). Value of industry mentoring and resource commitment to the success of an undergraduate internship program: A case study from an Australian University, *International Journal of Work-Integrated Learning*, 19(2) 155-168
- Ismail, Z. (2018). *Benefits of internships for interns and host organizations. Knowledge, evidence and learning for development*. Helpdesk Report
- Kaul, S., Ferguson, C., Yan. Y., & Yanik, P. (2019). Triangulated mentorship of engineering students-leveraging peer mentoring and vertical integration. *Global Journal of Education*. 21(1) 14-23
- Kendricks, D.K., Nedunuri, K.V. and Arment, A. (2013). Minority students' perceptions of the impact of mentoring to enhance academic performance in STEM Disciplines. *Journal of STEM Education*, 14, (2) 38-46
- Kram, K. E. (1985). *Mentoring at work: Developmental relationships in organizational life*. Glenview, IL: Scott Foresman
- Maertz, C. P., Stoeberl, P. A., & Marks, J. (2014). Building successful internships: Lessons from the research for interns, schools and employers. *Career Development International*, 19 (1), 123-142. <https://doi.org/10.1108/CDI-03-2013-0025>
- Marsono, A., Sugandi, M. Tuwoso, & Purnomo (2017). Study the impact of internship on improving engineering students' competency. *Green Construction and Education for Sustainable Future*. AIP Publishing
- Meeuwissen, S., Stalmeijer, R., & Govaerts, M. (2019). Multiple-role mentoring: mentors' conceptualization, enactment and role conflicts. *Medical Education*, 53, 605-615
- Ministry of Education (2018), *Ethiopian Education Development Roadmap (2018-2030)*, Ministry of Education. Addis Ababa, Ethiopia
- Michigan, U.o (2011). *How to Mentor Graduate Students: A Guide for Faculty*. 2011
- National Academy of Engineering, U. (2004). *The engineer of 2020: Visions of engineering in the new century*. National Academies Press Washington, DC

- O'Shea, M. (2014). Informal mentoring by teachers: Strategies to increase student engagement in secondary learners at risk. *International Journal of Arts & Sciences*, 7(4), 71-82
- Ozek, H. (2018). Impact of internship programme in Engineering Education. *The Eurasia Proceedings of Education and Social Science*, 9, 276-283
- Pisimisi, S. and M. Ioannides, (2005). Developing mentoring relationships to support the careers of women in electrical engineering and computer technologies. An analysis on mentors' competencies. *European journal of engineering education*, 30(4), 477-486
- Ratnapalan, S. (2010). Mentoring in medicine. *Canadian Family Physician* 56, 198
- Retallick, M.S. and M.L. Pate, (2009). Undergraduate student mentoring: What do students think? *NACTA Journal*, 24-31
- Riskin, E., Ostendorf, M., Cosman, P., Effors, M., Li, J., Hemami, S., Gray, R. (2004). *Mentoring for Academic Careers in Engineering*: Proceedings of the PAESMEA. Grayphics Publishing.
- Rosemary, M., O. Ekechukwu, and M.N. Horsfall (2015). Academic Mentoring in Higher Education: A Strategy to Quality Assurance in Teacher Education in Nigeria. *European Journal of Research and Reflection in Educational Sciences*. 3(2) 37-47
- Salzman, N. & Strobel, J. (2011). Motivational and Benefits for college students and serving as Mentors in a high school Robotics competition. *School of Engineering Education Graduate Students series*. 1-22
- Sisay, G., & Eshetie, B. (2018). Impact of internship program on Engineering and Technology Education in Ethiopia: Employer's perspective. *Journal of Education and Training*, 5(2) 127-140
- Snowden, M. & Hardy, T. (2012) *Peer mentorship and positive effects on student mentor and mentee retention and academic success. Widening Participation and Lifelong Learning*, 14. 76-92
- Srivastava, S. and Jomon, M.G. (2013). Mentoring and performance: Implications for business organizations, *Indian Journal of Industrial Relations*, 48(4), 711-725
- Switzer, J. (2010). From homer to high tech: the impact of social presence and media richness on online mentoring in higher education. In Concetta, S., Catherine, S., & Melissa, S. (Eds.) *Teaching and Learning with Technology*. Routledge
- Thompson, D. (2014). The thing employers look for when hiring recent graduate. *The Atlantic* retrieved from <http://www.theatlantic.com/business/archive/2014/08/the-thing-employers-look-for-when-hiring-recent-graduates/378693/>
- Wronka, M. (2013). Mentoring in the concept of the learning organization in higher education. *Management, University of Zielona Gora*, 17(1)274-291
- Zerihun, G. (2019). Challenges facing internship programme for engineering students as a learning experience: A case study of Debre Berhan University in Ethiopia. *IOSR Journal of Mechanical and Civil Engineering*, 16(1) 12-28