Semiconductor Optoelectronics

ENHANCEMENT OF PROBLEM-SOLVING SKILLS AND REASONING SKILLS BY STUDENT-CENTERED ACTIVITY-BASED LEARNING FRAMEWORK

L John Louis

Principal, Government Polytechnic College, Valangaiman, Tamilnadu, India
E-mail: Sllouis1966@gmail.com

ABSTRACT

Education has become a weapon to induce social, economic, and cultural transformation to achieve national goals in this globalized world with a knowledge economy. To meet the demands of the digital age, it is critical to adapt how education is delivered - to foster and develop the traits that will enable an individual to live a meaningful life and face challenges in the job. The purpose of this research is to design a student-centered pedagogical framework to enhance the employability skills of the freshmen diploma graduate through activity-based learning. This research aims to implement a new student-centered activity-based learning framework with problem-solving skills, processing speed, and reasoning skills.to develop confidence, presentation skills, accountability, responsibility, adaptability, interpersonal skills, communication skills, lifelong learning, collaboration skills, and willingness to learn thereby, strengthening the employment skills of the diplomaengineering for their personal and professional success. This study recognizes an individual's latent potential by motivating them to think beyond their limitations and turning obstacles into possibilities.

Keywords: Diploma, Education, Problem, Reasoning, Skills

INTRODUCTION

While India is rapidly transitioning into a powerful economy, there exists a wide gap between industry and academia, between what is taught and what is expected or needed from the freshmen graduates. The higher education system, especially diploma education in India is witnessing a paradigm shift from teacher-centered, content-centered, or curriculum-centered to student-centered pedagogical techniques [1]. Employability skills play a vital role in getting and sustaining a job for the freshmen graduates taking engineering and other professional courses. Freshmen graduate having employability skill always has increased chances of getting employed in the national and international arena and also better chances of retaining their job. During the job-seeking process, group discussions and personal interviews also take place [5]. After seeking the job, the retention and the progress of the candidate also depend upon his employability skills and some other core competencies. Employability skills are considered to be a valuable career booster. Employability is the enhancement of skills and personal attributes that help an individual in getting a job, sustaining it, and being beneficial to the employer as well. Employability skills are the skills that make a candidate employable [7]. Employability skills encompass skills to convey ideas, understand or interpret information, and analyze the information by verbal or non-verbal means.

Various facts of core employability skills like presentational skills, writing and editing skills, communication skills, interpersonal skills, effective listening skills, and expression of ideas concisely and confidently are some of the skills recognized as key skills for getting jobs and excelling in the global arena [2]. Graduates are always important to the advancement of the community, which calls for critical analysis, problem-solving, collaborative abilities, choice making, communication skills, morality, understanding of human values, compassion, and accountability, among other things. They can contribute to the welfare of humanity thanks to these abilities. the fundamental employability abilities, such as self-control, dependability, ambition, collaboration, openness to learning, adaptability, empathy, listening, and following directions for tasks [3,4].

Importance of employability skills for global success

They generally lack the necessary abilities to get employment due to India's poor higher education system. These adequate skills were certainly core employability skills including the English language as a communication skill and as an essential employability skill [28]. In this age of technology, information travels at the lightning speed making the humongous world a global village where English is one of the basic and the most significant skills to outshine in the techno-savvy world. With the increasing demand for computers in almost every arena, English has received a further boost [15]. Not only jobs but even higher education is also possible in English. Hence, with the ever-changing and growing demands of the competitive world, English plays a commendable role in securing a job and sustaining it smoothly.

India become the largest education network in terms of students, teachers, and institutes. There is a dire need for transformation in the current educational system. Only when the ability to raise standards as well as the enthusiasm to include both educators and students have become a driving attitude of those in charge of providing education will the transition process begin. Teachers' engagement can be improved by arranging more effective teacher training programs and inculcating awareness about the child-centered teaching-learning process [18]. The new national policy on education offers a framework for change and makes education modern with optimal use of technology. In this globalized world with a knowledge economy, education becomes a tool to bring social, economic, and cultural transformation for achieving national goals [17, 24]. It is crucially important to alter how education is delivered to foster and build the characteristics which can allow a person to live a fulfilling life to meet the requirements of the digital world. The newly proposed policy-making on schooling is focused on raising the standard of instruction and regaining public trust in it. It aims to establish circumstances that will enhance the caliber of instruction, learning, and evaluation. Young pupils should be given every chance to receive a high-quality education and learn skills, such as career development, which lead to jobs and entrepreneurship.

The development of values, understanding, knowledge, as well as skills, need to be the four main focuses of education in upcoming years. These need to encourage the growth of character traits and behavioral traits that will assist the kids to become productive people. But the employers are not able to get what they need in fresh graduates in terms of skills and core values. Despite the availability of jobs, employability prevails massively. Upskilling is the need of the hour [6, 27, and 31]. Inculcation of employability skills is essentially required. The action research shows how effective is student-centered activity-based learning in enhancing employability skills in the lack of application of pedagogical techniques to enhance

employability skills.

The major reasons for the gap in employability skills of the students are

1.   Course content lacking emphasis on employability skills, graduates to bridge the employability gap.

2.   Lack of opportunity for diploma students to practice employability skills.

The most important factor responsible for the lack of employability skills is that there is no special course integrated with the curriculum that provides opportunities to the pupils to develop and hone employability skills [8]. Even the teaching methods are a century old. The teacher is always the center of the teaching-learning process. As long as the learner will not become an active participator, knowledge giver, creator, and sharer, the learning will not be internalized. Hence, the learner-centric approach should be focused to make the learners active creators and users of the knowledge with apt attitudes that will help them to hone employability skills.

Education now serves as a vehicle to carry about social, economic, and performance parameters for accomplishing national objectives in this globalized world with such a knowledge-based economy [30]. This is extremely important to alter how education is provided to foster and enhance the abilities which can allow someone to live a fulfilling life as well as face difficulties at work [12]. This is necessary to meet the requirements of the digital world. This study on schooling intends to raise the standard of instruction and establish its legitimacy. It aims to establish circumstances that will enhance the caliber of instruction, training, and evaluation. Young kids should have every chance possible to receive a high-quality education and pick up skills, such as employable abilities that can lead to jobs and enterprise.

Graduates attributes form a set of individually assessable outcomes that are the components indicative of the graduate's potential to acquire competence to practice at the appropriate level [13, 19]. The graduate attributes are exemplars of the attributes expected of a graduate from an accredited program, which include.

1.   1. Subject-Matter Knowledge: Use your understanding of physics, math, engineering basics, and your chosen engineering specialty to solve challenging engineering challenges.

2.   2. Problem Analysis: Use the fundamental concepts of diploma, the natural sciences, as well as engineering sciences to discover, formulate, investigate the research, and analyze difficult engineering issues.

3.   3. Design/Development of Solutions: Design products for difficult engineering issues and design elements of the system or procedures that satisfy specific requirements while taking into account the public's safety, economic, socioeconomic, as well as environmental factors as necessary.

4.   4. Investigate complicated issues utilizing study knowledge and study techniques, such as the design of experiments, data processing and interpretation, and information synthesis to reach reliable results.

5. Utilisation of Current Tools: Develop, choose, and use Modern Tools, especially Estimation and Modelling, for Complex Mathematical Activity while recognizing the Restrictions.

6. Environment as well as Sustainable development: Appreciate how expert solutions affect society's and the environment's circumstances and show that you are aware of the necessity for and are knowledgeable about ecological sustainability.

7. Ethics: Adhere to ethical conduct, duties, and practice standards. Employ ethical principles.

8. Team and Individual Work: Perform well both alone and as a team player or leader in a variety of teams, and interdisciplinary environments.

9. Communication: Communicate properly on complicated activities the with organization and society, including the ability to understand and write positive reviews and design documents, provide and accept clear directions, and ensure efficient presentations.

THE STATEMENT OF THE PROBLEM

It is indeed pathetic that various steps have been taken by the educationists to improve the state of education, making it practical and application-oriented but yet, more than 85% of the graduates are unemployable or not industry ready [14,29]. It is necessary to unearth the real reasons behind this employability gap. The major reasons for the gap in employability skills of the students are the lack of application of pedagogical techniques to enhance employability skills [22]. The most important factor responsible for the lack of employability skills is that there is no special course integrated with the curriculum that provides opportunities to the pupils to develop and hone employability skills. The teacher is always the center of the teaching-learning process [9]. As long as the learner will not become an active participator, knowledge giver, creator, and sharer, the learning will not be internalized [23]. Hence, the learner-centric approach should be focused to make the learners active creators and users of the knowledge with apt attitudes that will help them to hone employability skills.

OBJECTIVES OF THE STUDY

This Action Research intends to fulfill the following objectives:

1. To pinpoint the primary factors that contribute to the lack of job skills among math learners in terms of communication trepidation, assurance, interpersonal skills, as well as teamwork.

2. Implementing a fresh, active learning environment, as well as student-centered, would then help students gain self-assurance, communication skills, commitment, responsibility, ability to adapt, interpersonal skills, life - long learning, teamwork, as well as a desire to learn all of which will help them succeed both personally and professionally.

3. To determine the efficacy and results of the pupil activity-based learning framework for boosting communications and high labor.

The purpose of this study was to assess the efficacy of a novel pedagogical framework centered on student activities that were created to help diploma professionals improve skill sets as well as other skills. In addition, the research also aimed at identifying the factors which obstructed learners from developing employability skills. Motivating the learners by targeting their affective domain which is rarely taken into consideration, especially in higher education is one of the main objectives of this research. This leads to the internalization of learning.

RESEARCH QUESTIONS

The research questions are noted below:

1.   How can the framework for student-focussed, activity-based learning be employed to develop employability skills in diploma graduates?

2.   Will student-centered   activity-based learning   framework   for develop employability skills of the fresh graduates?

3.   What are the results of executing a student-focussed activity-based learning strategy on fresh graduates?

METHODOLOGY

In the present study, action research (AR) is the best and most suitable method effort which has been made to enhance employability skills using the learner-centered approach, wherein the learners are active, motivated, ready to receive, respond to regular content questions, give feedback to other peers and receive feedback from the peers, practice at home, are inspired to practice speaking English, understand the significance of employability skills, even when there is no class or session. Ample care had been taken for providing flexible learners learning environment. The integration of technology in this action research has helped a lot to internalize learning and modern digital technology. It has been observed that this approach works very well. Emerging from this research is a new student-centered pedagogical framework to teach skills.

Being a kinesthetic learner, "learning by doing" and action research have benefitted in terms of developing the research skills as well as a new pedagogical framework to solve the problems of language in the classroom which are now faced by many language teachers as well [21]. Though this action research deals with a fixed set of learners, i.e. Diploma graduates; after the validation process, statistical analysis of the accumulated data and the feedback of the learners encouraged me to recommend this framework could be used for many fresh graduates to inculcate employability skills.

Data Collection

In this research, the following tools are used to collect data.

a.   Personal Report of Communication Apprehension (PRCA-24) is used to diagnose the communication apprehensions of the students, communication being one of the most important employability skills at the beginning and the end. It's a tool created by James McCroskey to assist people in determining one's degree of communication anxiety [25, 26]. It's the tool that is often frequently used in university classes to measure students' communication anxiety. This tool comprises twenty-four phrases that describe how you feel about communicating with people. Every one of the 24 assertions has four possible responses: 1-strongly, agree, agree but aren't sure, and disagreement or disagree.

b.   Comprehensive and Consistent Evaluation Forma (CCEF) or Personal Assessment Forms or Comprehensive and Consistent Evaluation Performa is the personal assessment form designed by the researcher based on experience. It contains most basic information to the most complex information with personality type and type of learners as well. The activities in which the students are assessed at the onset of the semester are group discussion, paper reading, extempore, one minute-my choice, debate, writing task, and confidence.

c.   Observation Rubrics: Rating Scales and rubrics (Activity sessions) contain the assessment of each activity performed in the auditorium on the stage. The form is filled out by the teachers. The rubrics of measurement were already informed to the learners. The rubrics for each activity were assessed and rated on a scale of 1 to 3, where 1 being needs improvement and 3 means excellent [25].

d.   The teacher Observation Form has been used during the implementation of the

framework to measure the progress of the pupils in ten selected skills for the classroom sessions [32]. It contains the list of employability skills/ behavior depicted by the students in the classroom during the research. Though random and regular observation is always been there recorded observation was in this form.

e.   Surveys were used which provided data about students' attitudes toward the new approach, especially the employability skills and confidence [10]. Likert - type scales as well as other surveying tools are made to gather and assess individual values, opinions, and views regarding particular topics. The survey format is online surveys using survey monkey. These surveys recorded the responses of the students about their experience, behavior, and knowledge related to the new framework designed to enhance employability skills.

f.   E-mail communication is allotted to further enhance the validity of the framework, randomly ten students were approached to write an email about the outcome of the student-centered activity-based learning framework [26].

g.   Semi-structured group interviews are conducted in which the students are selected randomly [20]. In one group interview, there were 15 students. The interview aims to gather students' feedback on the new framework and the requirement for changes in activities or the teaching content. These proved to be successful in better understanding their feelings, attitude, expectations, and hurdles in developing and honing employability skills.

In essence, all data gathering techniques were applied systematically before, during, and afterward the study designs. The data collected in these action studies offers qualitative and quantitative analysis. In this research, value coding has been used to capture the participants' attitudes and beliefs toward a new student-centered framework based on activity-based learning.

The Action Research Cycles

The action research aimed to design a fresh approach for Activity-Based Learning focused on students to enhance employability capabilities and to investigate the effectiveness of efforts to implement this framework. It also aimed to explore the reasons that hindered students from enhancing their employability skills. There are two research cycles in this research project. In the first cycle, all the nine activities (Activity sessions) are executed along with the classroom sessions. All the pupils and the teachers and the mentors performed their duties: strategy, act, perceive, as well as reflect the action research method of Mc Taggart and Kemmis[11, 16]. It consists of 4 hours weekly sessions for 10 weeks in the first and the second cycle. After the data collection and analysis the data, activity sessions, and classroom sessions are revised to improve the next cycle with the addition of peer review on the performance of each student by his group members, once a month for consecutive four months.

RESULTS AND DISCUSSION

a.   Designing a fresh approach for Activity-Based Learning focused on students to enhance core Employability skills

This includes classroom interactions, personal interactions, discussions with the seniors, and interactions with the faculty members and heads. A semi-structured interview is also conducted with 9 students who are asked the set of questions. After doing initial coding and focused coding, the following table shows the reasons for the negative attitude and the various learning strategies that can be used to encourage the participation of the students in CPDP. The majority

of the students lacked in speaking or using English, as shown in Table 1.

Table 1: Semi-Structured Interview outcomes.

LABEL/CODING CATEGORY	TOTAL STUDENTS	EXAMPLE STATEMENT
Negative attitude towards employability skills/non-technical skills/Stage Fear	7/9	• Employability skills are not important for getting a job. These can be inculcated later. Technical skillsare essential. • Those who are not good at English get a job if they are good at technical skills
Appreciate rote learning	3/9	• I have to learn verbatim but I find it very difficult. I cannot memorize but I write in my own words. • I try to understand the concept and write in my words.
Lack of presentation skills	3/9	• I do not like to present in front of all. • I cannot speak in front of others but I can write in my own words. • I try to understand the concept and write it in my words but presenting it to others is hard.
Asking questions/asking for clarification/ Not focused/goal oriented…	2/9	• No, I never ask questions. • No, I feel shy to ask questions in front of all. I do ask when my teacher is alone. • My teacher gets irritated if I ask a question from him. • We are not allowed to speak when the teacher is teaching or explaining. If we do so, we are scolded.
Interaction in class	1/9	• No, we have to listen to the teacher's explanation. The teacher scolds us if we discuss it in class. • We do not interact or talk to each other in class. We have to sit silently and take notes.
Group work in class	5/9	• No, we have to listen to the teacher's explanation. Hence, no group works. • The teacher scolds us if we discuss it in class. • We have not been provided the environment to engage in group work in the class but I like it. • I think group work is exciting as I can share my views but we have to sit silently in the class and take notes.

Appreciate Lecture method	5/9	• I am comfortable with the lecture method. • The lecture method is fine for me as I cannot understand on my own.
Marks-oriented approach	8/9	• If I do not score well, I will not get a job. • My parents will scold me if I do not get a job. Marks will help me to get a job
Lack of English-speaking atmosphere	8/9	• We were taught in our mother tongue and not in English. • We talk in our mother tongue at home. No one speaks English with me. • If I speak English with others, they make fun of me.
Large classrooms	9/9	• Because of many students, teachers are not able to focus on all the students. • I had 65 students in my class. It was difficult for the teacher to maintain discipline at times.
More focus on Physics, Chemistry & Maths	9/9	• Preparing for competitive exams to get admission in engineering is more important than English. • Only PCM marks are counted for the admissions.

Hence, it is evident that not only the students are not interested in developing employability skills but only in scoring marks. They think that jobs will be secured if they get good marks and technical skills. At the same time, no environment of group work, interaction with their peers, asking questions, seeking clarifications, etc. had been provided to them in their previous years of learning. This results in high communication apprehensions among 80% of the students and a dearth of employability skills.

b.   Oral Communication in English: Group Interview

The interviews were taken in a group of eight to ten students and the time for each group was 30 min. five group interviews were conducted. In these sessions designed to take group interviews, they were asked to introduce each other to themselves. It was observed that without seeking help from anybody: peer, friend, or faculty, 85 % of them were not even able to introduce themselves. Incorrect sentence formation, syntax error with very less or no fluency, incorrect pronunciation, and inappropriate use of style and register were apparent. Many of them introduced themselves in their mother tongue asserting that they could not communicate in English. During the interview, they were assessed on the following parameters on a scale of 0 to 10.

c.   Written Communication in English

The students were asked to write the answers to any five of the following questions:

a.   Use five adjectives that suit you the best.

b.   Write five sentences about your favorite personality.

c.   What is your free-time activity?

d.   Why do you want to be a mathematical graduate?

e.   What do you think what type of learner are you?

f.   What will you do if you come to know that today is your last day on the earth?

g.   What will you like to change in the current education system?

h.   According to you, what is more important: Skills or marks? Why?

i.   Write a short paragraph about yourself. (5 or more sentences)

j.   Write a few suggestions to improve the slots of Enjoy Learning English (ELE).

Writing in English was equally full of flaws. The advent of computers and typing and auto-correct options make them forget or not to learn spellings. There were   spelling errors in even simple words as shown in table 2 below:

Table 2: Correct and corrected words

Incorrect	Corrected	Incorrect	Corrected	Incorrect	Corrected
presntation	presentation	trunament	tournamnet	This	These
tem	team	principle	principal	Amaizing	Amazing
drowing	drawing	listeing	listening	Was study	Was studying
plantetion	plantation	machin	machine	Sketing	Skating
Certi-ficat	certificate	leval	Level	Compition	competition

The brainstorming sessions were arranged to investigate and find out the reasons for the negative attitude of the students to attend employability skills classes followed by one-on-one sessions. An extra time slot of 4 hours per week was arranged for them to observe them, which continued for almost three months. It was observed that very few students (15%) wanted to improve their Employability skills in the beginning. More than 60% of them had a fear of speaking or communicating in English. At the same time, all the students in the English medium do not possess good communication skills: oral, written, reading, and listening. Almost after one month of regular discussion, brainstorming and interactive sessions, discussions, observations, diagnostic tests, etc. the students agreed that employability skills are important for them in the future and can be learned interestingly with a student-centered approach

d.   Innovative New Student-centered ABL Framework

The observations, feedback analysis, interactive sessions with the faculties and students, experience, literature review, and insights guided the preparation of a framework that is centered on student-centered learning and activity-based learning. The aim was to inculcate employability skills like collaboration, accountability, leadership, presentation skills, etc. among the diploma graduates which will help them to strive in their future workplace. While designing this new approach, the following points are considered:

a)   The digital natives like "learning by doing"; hence, an activity-based approach is to be used.

b)   The student-centered framework that will have at its center students and the role of the

teacher/faculty is a facilitator.

c)   Using a variety of learning strategies so that all types of learners could be engaged.

d)   The resources or the activities designed for relating real-life experiences or those could be relevant to their past and present life.

e)   It should aim at practicing speaking skills and employability skills like collaboration, leadership, presentation, accountability, empathy, lifelong learning, etc.

f)   It should provide ample opportunities for practicing Employability skills with feedback and reviews to the pupils.

g) Pupils learn more effectively when they possess implicit faith in their teachers.

h) They have confidence in their skills and capabilities.

They receive a supportive, non-threatening, adaptable teaching atmosphere with a continuous peer as well as formative feedback.

j) They are given the chance that develops their critical learning abilities in a secure setting. It is referred to as a non-threatening atmosphere. when pupils are open to discussing their ideas, plans, and aspirations with both the instructor as well as other pupils.

The figure 1 shows the new hierarchical framework designed to enhance employability skills. The educational goals for pupils' overall growth are as follows: The learners will have the ability to:

The learners will have the ability to:

2. To obtain a stable competitive environment for studying the subject's fundamentals while boosting cognitive comprehension through excitement.

3. Constantly looking for direction to advance and succeed on both a professional and personal scale.

4. To participate in cooperative and competing learning with interest.

5. To care as well as value others, cultivate fairness, be flexible, and be open-minded.

6. To use a research-focused strategy to transform difficult technical subjects into engaging drama.

7. To examine how the subject is used in real life as well as to emphasize the value of teamwork as well as timekeeping.

8. To lead the team effectively by being responsible and accountable.
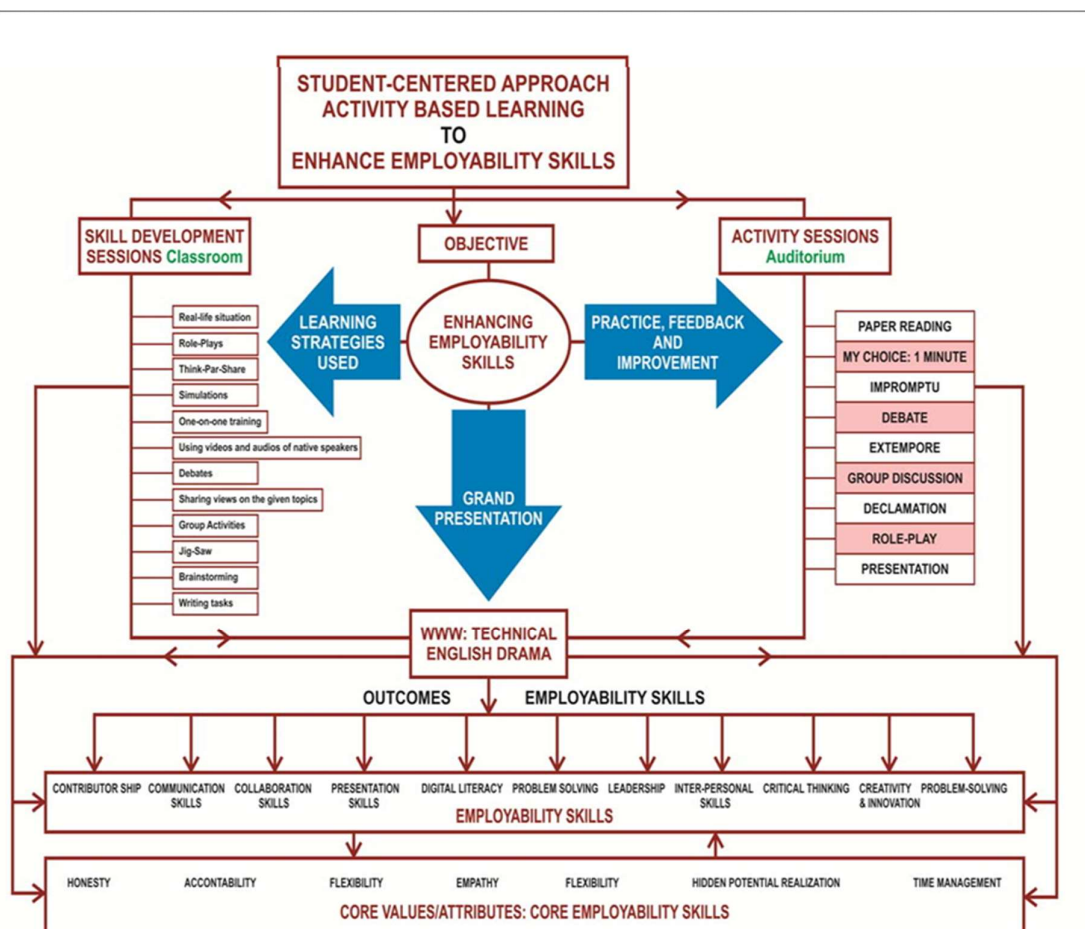
Figure 1: Student-Centered ABL Approach to Enhance Employability Skills

Two groups of students from the diploma department participated in this research project. In Cycle I, one hundred fifty students participated and nine students did not participate as the participation was voluntary. They had to take the course Communication skills and Contributor Personality Development Program in the first and second semesters respectively. The new pedagogical framework was designed as an intervention. In Cycle II, one hundred and thirty students participated. Besides the students, the industry experts and recruiters from the industry also formed an inseparable part of this research as their feedback and suggestions also form the basis of changes in Cycle II.

e.   Action: Activity Sessions

The two hours were for the activity slots, primarily including activities to overcome their communication apprehensions, develop confidence and remove their stage fear, as shown in Table 3.

Table 3: Nine Activities with Targeted Skills/Traits

ACTIVITY	TARGET SKILL	TARGET SKILL	TARGET SKILL	TARGET TRAIT
PAPER READING WEEK 1	Reading	Stage fear	Communication	Confidence
IMPROMPTU WEEK 2	Speaking	Stage fear	Thinking	Confidence

MY CHOICE WEEK 3	Fun & Enjoyment	Stage fear	Encouragement	Confidence
DEBATE WEEK 4	Analytical and logical	Presentation	Speaking	Confidence
EXTEMPORE WEEK 5	Thinking	Presentation	Thinking	Confidence
GROUP DISCUSSION WEEK 6	Speaking/ Fluency	Teamwork	Inter-Personal Skills	Confidence
DECLAMATION WEEK 7	Speaking	Presentation	Memorizing	Confidence
ROLE-PLAY WEEK 8 PRESENTATION WEEK 9	Teamwork Presentation	Presentation Stage fear	Thinking Non-verbal	Confidence Confidence

As the main objective of these sessions was speaking with confidence and facing the audience without fear and working in teams, the venue selected is the auditorium. The microphone and the podium were also provided to the students to give them a real- feel and to inculcate sincerity and seriousness for the activity sessions.

Activity 1: Paper Reading

Initially, the students are hesitant as they had never got a chance to participate or come on the stage. They need guidance on how to stand on a podium, how to hold a microphone, how to read aloud, how to face the audience, and pronunciation of some common words. It is to be noted that the focus of this task was majorly on reading skills, as shown in Figure 2. Only 56 out of 150 students participated in these sessions which went for week 1.
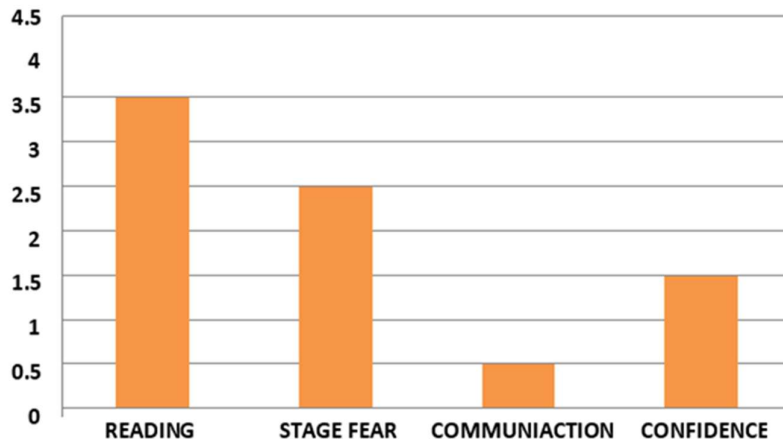

Figure 2: Focus of Paper Reading

Activity 2: Impromptu

This was the second week of the activity sessions. From each class, almost 20 students participated and experienced overcoming or facing the stage fear. It was a double challenge to speak English and that too in front of a large audience was not easy for them. This time almost 60% of the students showed interest to participate and speak in front of all. Some of them noted down a few hints on the papers. The focus of this activity was confidence as shown in Figure 3. This activity was considerably tough for them but they participated with enthusiasm. Only 90 out of 150 students participated in these sessions which were scheduled in week 2.
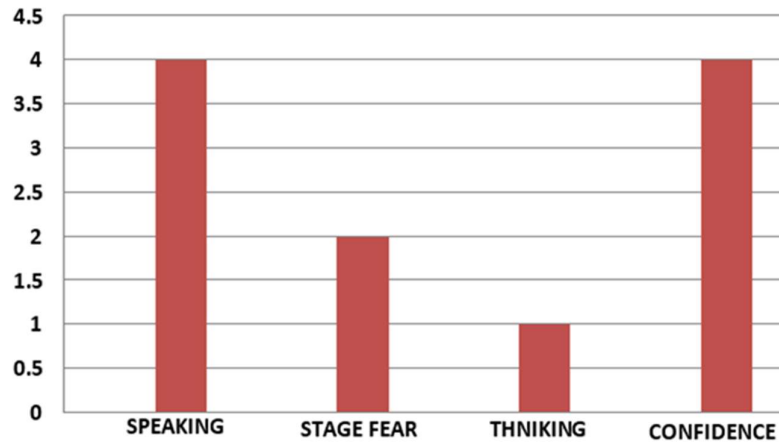
Figure 3: Focus of Impromptu

Activity 3: One Minute-My Choice

While other activities were performed in English, in this activity, the students had the freedom
to perform in any language. Though many of the students preferred English some of them also
used their mother tongue as well. This was the most enjoyable activity for them as it allowed
them to do anything they liked for 1 minute. They were also given the freedom to perform
either individually or in a group. The focus of this activity was fun and enjoyment and
encouraging them to participate, as shown in Figure 4.
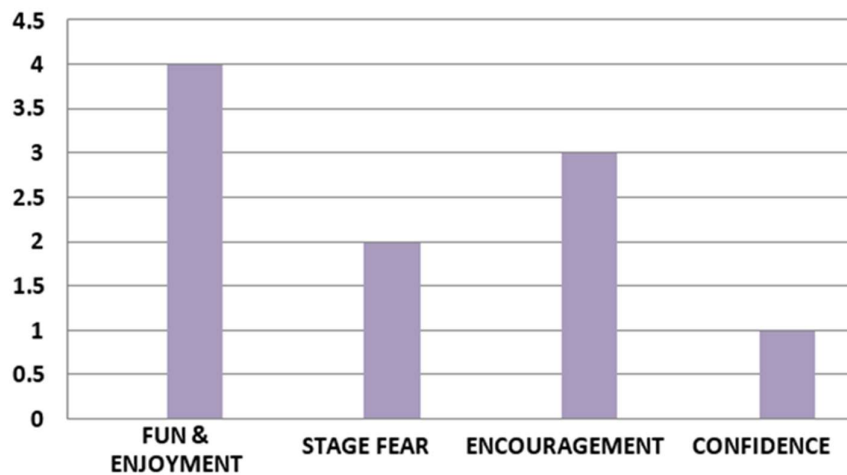
Figure 4: Focus of My Choice

Through this activity, many students were able to showcase their hidden talents. As this was
the third week, the response from the students was appreciable. They participated with full zeal
and gusto. It also enabled them to build relationships with their other classmates. Only 118 out
of 150 students participated in these sessions which were scheduled in week 3.

Activity 4: Debate

While in the previous activity, the students had the freedom to perform in any language, the
debate was to be done in English. Though many of the students preferred English some of them
tried to use their first language most time. This was one of the most enjoyable activities as the
students love to debate. The focus of this activity was analytical and logical thinking, as shown
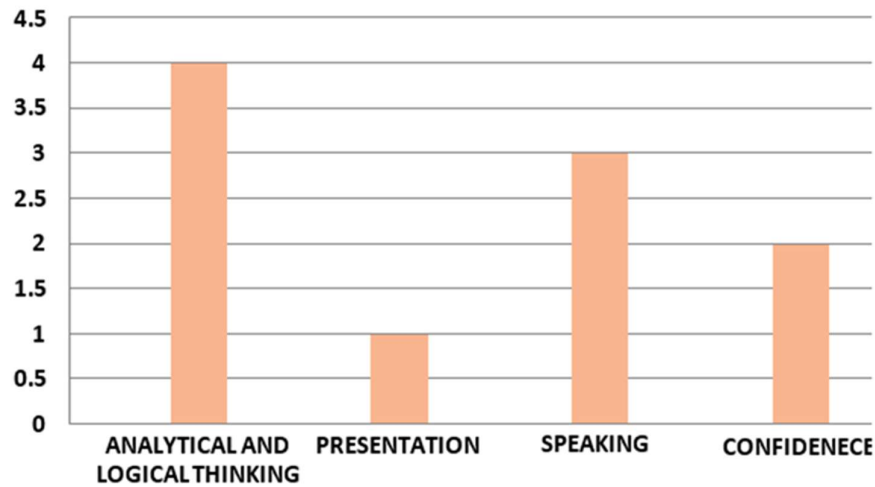
in Figure 5.

Figure 5: Focus of Debate

Through this activity, many students were able to showcase their hidden talents. As this was the fourth week, the response from the students was appreciable. They wanted to participate but they were not able to justify their answers or present the counterpoints. Only 60 out of 150 students participated in these sessions which were scheduled in week 3.

Activity 5: Group Discussion

This was also one of the most favorite activities of the students and famous as well. They were aware that during the interviews, group discussions are also organized often, so almost all the students expressed their interest to participate. While in the previous activity, the students had the freedom to use a bit of their mother tongue, group discussion was to be done in English completely. The focus of this activity was speaking and confidence building.
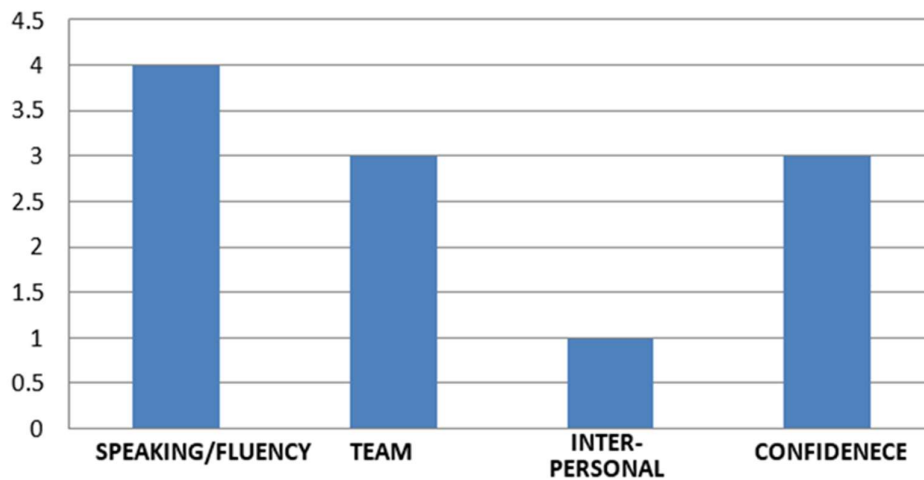

Figure 5: Focus of Group Discussion

Through this activity, many students were able to showcase their hidden talents. As this was the fifth week, the response from the students was appreciable. Though no time was given to them to think, many of them were not able to speak for length. Their participation spirit was

commendable. Only 130 out of 150 students participated in these sessions.

Activity 6: Declamation

This was also one of the toughest activities for the students as they had to remember long content in English. They had to memorize and speak. They were not allowed to use paper. This activity could not be performed well as a very less number of students participated. This was also completed in English completely. The focus of this activity was speaking and confidence building, as shown in Figure 6. Only 60out of 150 students participated in these sessions.
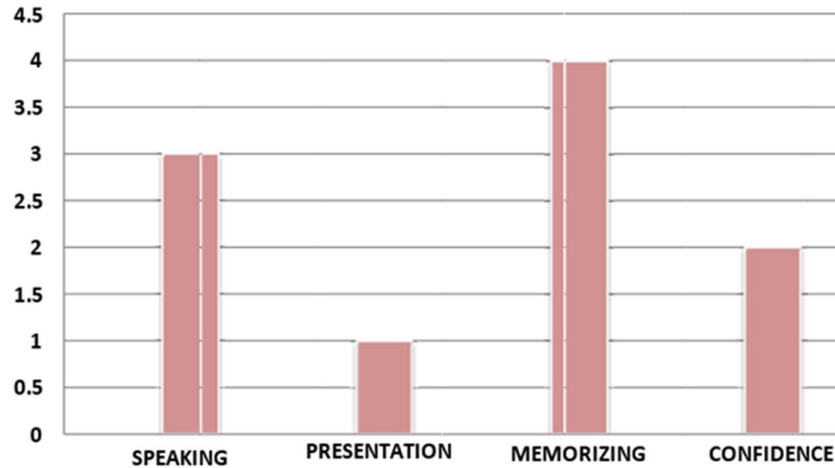

Figure 6: Focus of Declamation

Activity 7: Role-Play

The students performed it in the classroom sessions very well. In this activity too, initially, they had to remember their dialogues but they found it easier as they had the context. Some of them did not need a script. Their speech was evolving. They were not allowed to use paper. This activity was performed by almost all the students with great enthusiasm and fun. This was also completed in English completely, though it was not grammatically accurate. The focus of this activity was teamwork and confidence building, as shown in Figure 7.
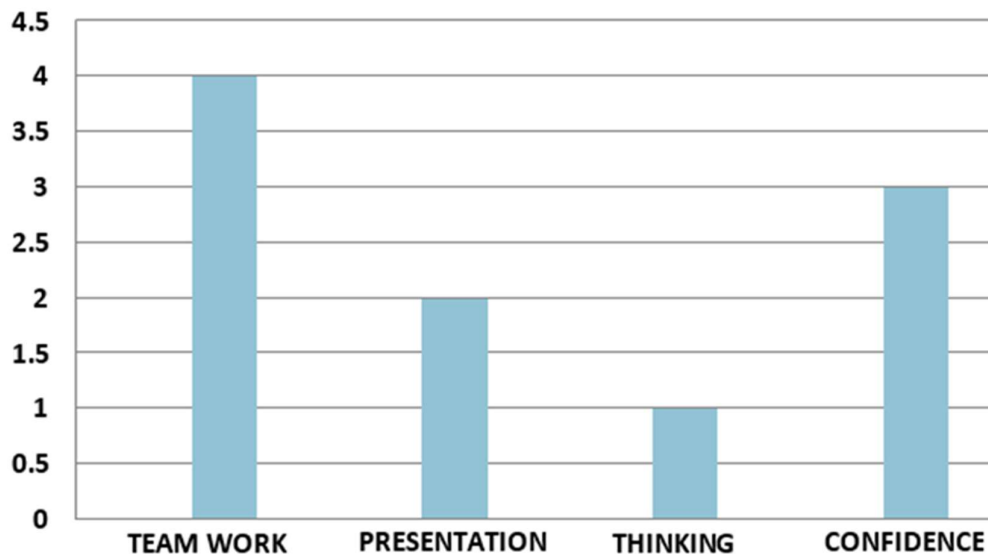

Figure 7: Focus of Role Play

Though this was the seventh week, the response from the students was highly appreciable.

Time was given to them to select their theme and prepare for it a week before. 135 out of 150 students participated in these sessions.

Activity 8: Presentation
This activity was performed by more than half of the students and especially those who missed one or the other activity. They knew that it was the last activity. Hence, they initiated to participate. In this activity too, initially, they had to remember their content but they found it easier as they had the context on the PowerPoint. Some of them did not even need the slide content, but their speech was natural. Most importantly, the topics chosen were quite interesting. They were not allowed to use paper. This activity was performed by almost all the students with great enthusiasm and fun as it was the last activity. This was also completed in English completely. The focus of this activity was presentation and confidence building, as shown in Figure 8.

Though this was the eighth week, the response from the students was highly appreciable. Time was given to them to select their theme and prepare for it a week before. 90 out of 150 students participated in these sessions.
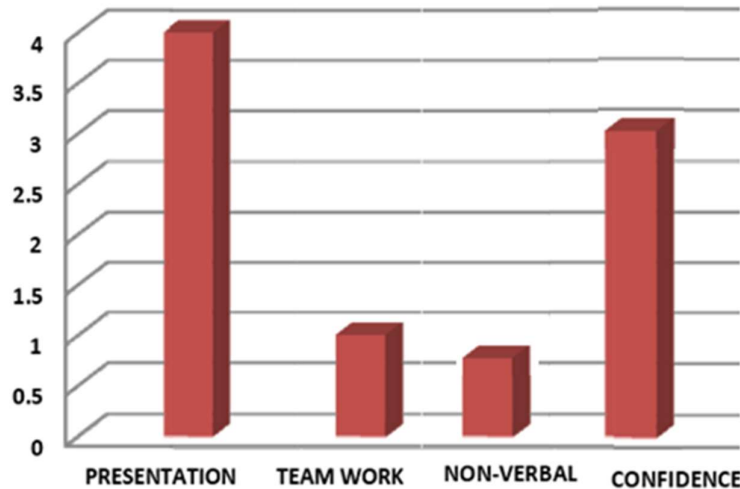

Figure 8: Focus of Presentation Activity

4.2.1   WWM (Wonder Work in Mathematicians) Mega Event: From script writing to presentations
This new pedagogical student-centered activity-based learning framework was developed with the target of affecting the learners' attitude to hone employability skills. The steps are mentioned in the process in figure 9 below.
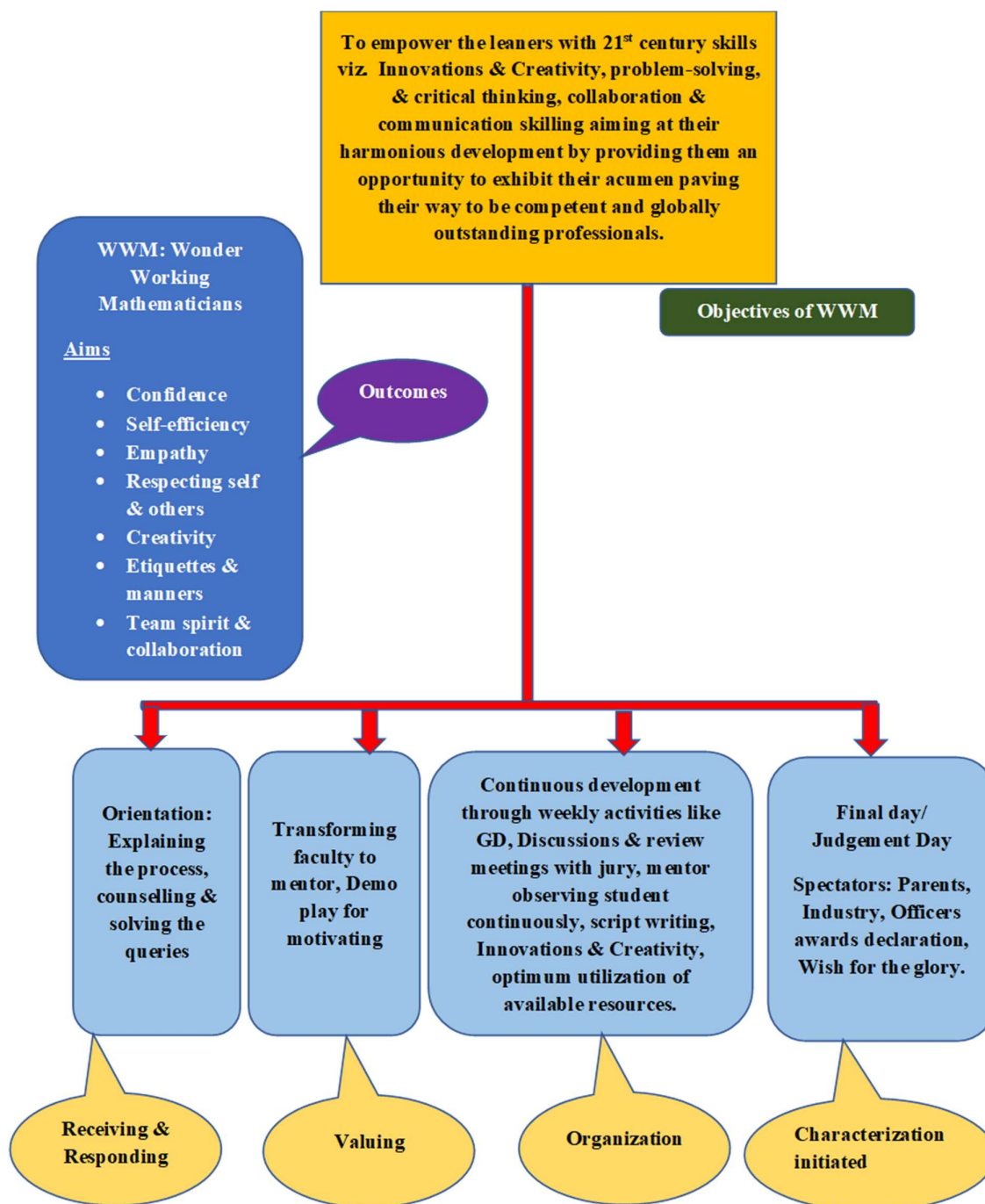
Figure 9: WWM concept

The above process chart of WWM (Wonder Work in Mathematicians) shows the steps that the students took to consequently reach the mega event. Along with the steps, the procedures used by them helped them to develop their affective domain. The five layers of said development of self-regulation, reacting, evaluating, organizing, and characterizing—had been fully taken into account in the step-by-step operations of WWM. Thus learner's emotions, as well as attitudes, are key factors in all learning styles. Learning is more about feelings and emotion-related effects than it is about cognition. Table 4 shows the implementation steps involved in WWM (Wonder Work in Mathematicians).

Table 4: Steps of Implementation of WWM

TASK	TIME	OUTCOMES/SKILLS DEVELOPED	PROCESS/ REMARKS
Selection of the Mentor & Technical Topic	2 weeks	• Comprehension skills • Analytical skills • Collaboration skills	• To select their technical topic and mentor. • To explore, research, and understand the topic in depth.
Industrial Visits /Talking to experts	2 weeks	• Communication skills • To deal with strangers and seek appointments. • Professional • Etiquettes and mannerism	• To apply the understanding of the topic to develop the script. • To get innovative ideas. • To practically understand the topic.
1st Panel Meet	2 hours fr each group	• Employability skills • Professional • Etiquettes • mannerism • Negotiation Skills • Analytical Skills • Question answer skills	• To discuss the topic and its development into a script and get it approved. • To discuss the props, intro, ending, stage settings, costumes, introductory video, etc.
Script writing, Role assignment, and Props selection	3 weeks	• Writing Skills • Thinking skills • Critical thinking	• To write the script of their own and elucidate the selected technical topic in the form of a drama or a film: Science Fiction. • To assign a role as per the actual traits of each student.
Rehearsals on the stage (without the presence of any instructor or mentor or experts)	15 days	• Speaking Skills Body language • Time management • Dialogue delivery • Eye-contact • mice handling • Collaboration • Analytical Thinking • Innovation	• To rehearse their dialogues • To use the full stage • To use the pros effectively on the stage • To give the proper cue to each other, to support each other. • To find if the assigned role suits the students. • To find out the hidden talent and strengths of each member and work accordingly.
2nd Panel Meet (in the auditorium)	2hours each group	Same as above	• To present formally the entire presentation in front of the panel • To get the props, costumes, dialogues, and videos used approved • To seek any suggestions or advice

Rehearsals and guidance to act and perform	3 to 4 hours per group	• Speaking skills • Body language • Time management • Dialogue delivery • Eye-contact • mice handling • Collaboration • Analytical Thinking	• To check every dialogue, expression, body language, and coordination. • To fine-tune, if required.
Costume finalization	8 days	• Collaboration • Time management Creativity	• To finalize the costumes as no budget was approved by the college.
Practices in front of mentors and experts	Regularly	• Speaking Skills • Body language • Time management • Writing skills • Technical skills • Dialogue delivery • Eye-contact, mice handling • Collaboration Skills • Fluency	• To get apt suggestions, technical as well as in terms of language and recommendations so that they could proceed to finalize the script.
Finalization of the Script	4 days	• All as above	• To finalize the script, role, dialogues, scenes, props, costumes, stage settings, etc.
Finalizing videos, sequence, introduction, and conclusion of each group.	4 days	• All as above Digital Literacy	• To finalizing of the videos, sequence, introduction, and conclusions of each group.
Final Performance	1 day to each batch of 60 students	• Communication Skills • Fluency • Time management skills • Leadership skills • Empathy • Collaboration • Confidence • Efficacy • Accountability	• To perform in front of their parents, mentors, peers, friends, experts from the industry, and subject experts including me. • Giving feedback and sharing their experience was the most effective part as it made even the parents fill their hearts with pride and eyes with tears. • A healthy competitive spirit was noticed among all the groups.

This was the major outcome of Cycle I which continued for a semester and cycle II. It included script writing, rehearsals, and final presentation. Keeping in mind this student-centered ABL framework, communicative activities took place in the class, four hours every week two in class for guided practice using face-to-face and two hours of spoken practice in the form of activities, eventually leading to script writing. These activities were in the form of free practice combined with Panel meets with continuous monitoring, rehearsals, script writing, editing,

revising, practicing, and re-editing; consequently leading to the grand performance on the stage as a group performance.

The real-life situations, social interactions, interviewing strangers, assigning roles, designing props, stage setting, practicing dialogue delivery, group work, etc. aimed at the learners have a challenge of writing a script with technical problems or content. They must provide the information in whatever language they had at their disposal. They must achieve some practical results. Learners might or might not use grammatical accurate sentences. Sharing and processing of information were also informed to reach a consensus. The affective domain of learning is connected with interests, feelings, emotions, and beliefs. The students' learning is better than usual if they learn by integrating three domains of learning. This had been observed that those students who were connected with this program or each other showed a significant improvement and also inspired others to participate and perform better.

CONCLUSION

This research was carried out to develop a new framework for developing and honing employability skills with a special focus on the learner-centered ABL approach. The inclusion of various activities enriches the entire pedagogy and strives to overcome the monotonous teaching methods normally used to teach. As English is a second language, not much emphasis is given to the teaching of English but to enhancing employability skills. Moreover, communication in English and writing in English is almost considered to be a challenge, not only by students but also by many working graduates. Enhancing employability skills is a time-consuming and long-lasting process and also needs the students to have much motivation to achieve the desired outcomes. After some time, the students become the motivating force for each other and learn best among peers. The industry also believes that technical skills can be inculcated and honed but the presence of core employability skills is essential.

REFERENCES

1.   Ahmed, I. A., & Mikail, M. A. (2022). Interactive Instructor for a Synergistic Student-Centered and Personalized Teaching: A Biosocial Approach. Education and Urban Society, 00131245221106717.

2.   Akben, N. (2020). Effects of the problem-posing approach on students' problem solving skills and metacognitive awareness in science education. Research in Science Education, 50(3), 1143-1165.

3.   Akben, N. (2020). Effects of the problem-posing approach on students' problem solving skills and metacognitive awareness in science education. Research in Science Education, 50(3), 1143-1165.

4.   Armbruster, P., Patel, M., Johnson, E., & Weiss, M. (2009). Active learning and student-centered pedagogy improve student attitudes and performance in introductory biology. CBE—Life Sciences Education, 8(3), 203-213.

5.   Aslan, A. (2021). Problem-based learning in live online classes: Learning achievement, problem-solving skill, communication skill, and interaction. Computers & Education, 171, 104237.

6.   Astawa, I. B. M., Citrawathi, D. M., Sudiana, I. K., & Wulandari, I. G. A. A. M. (2022). The Effect of Flipped Classroom Based on Disaster Map Visualization in Disaster Mitigation

Learning on Students' Self-Efficacy and Critical Thinking Skills. Jurnal Pendidikan IPA Indonesia, 11(2).

7.   Aytaç, T., & Kula, S. S. (2020). The Effect of Student-Centered Approaches on Students' Creative Thinking Skills: A Meta-Analysis Study. International Journal of Contemporary Educational Research, 7(2), 62-80.

8.   Bawaneh, A. K., Moumene, A. B. H., & Aldalalah, O. (2020). Gauging the Level of Reflective Teaching Practices among Science Teachers. International Journal of Instruction, 13(1), 695-712.

9.   Bishnoi, M. M. (2020). Flipped classroom and digitization: an inductive study on the learning framework for 21st century skill acquisition. JETT, 11(1), 30-45.

10.   Brookes, D. T., Ektina, E., & Planinsic, G. (2020). Implementing an epistemologically authentic approach to student-centered inquiry learning. Physical Review Physics Education Research, 16(2), 020148.

11.   Chatmaneerungcharoen, S., & Sricharoen, N. (2021, March). Supporting interdisciplinary instruction on science, diploma and technology for Thai gifted students: centered on Raiwa lesson plan. In Journal of Physics: Conference Series (Vol. 1835, No. 1, p. 012039). IOP Publishing.

12.   Darma, I. K. (2018). Improving mathematical problem solving ability through problem-based learning and authentic assessment for the students of Bali State Polytechnic. In Journal of Physics: Conference Series (Vol. 953, No. 1, p. 012099). IOP Publishing.

13.   Dolapcioglu, S., & Doğanay, A. (2022). Development of critical thinking in diploma classes via authentic learning: an action research. International Journal of Mathematical Education in Science and Technology, 53(6), 1363-1386.

14.   Du Plessis, E. (2020). Student teachers' perceptions, experiences, and challenges regarding learner-centred teaching. South African Journal of Education, 40(1).

15.   Evendi, E., Pardi, M. H. H., Sucipto, L., Bayani, F., & Prayogi, S. (2022). Assessing students' critical thinking skills viewed from cognitive style: Study on implementation of problem-based e-learning model in diploma courses. Eurasia Journal of Diploma, Science and Technology Education, 18(7), em2129.

16.   González-Pérez, L. I., & Ramírez-Montoya, M. S. (2022). Components of Education 4.0 in 21st century skills frameworks: systematic review. Sustainability, 14(3), 1493.

17.   Hammad, B., Al-Zoubi, A., Hijazi, H., & Al-Khasawneh, A. (2020, April). Student-Centered Engineering Education: The Renewable Energy Case. In 2020 IEEE Global Engineering Education Conference (EDUCON) (pp. 477-486). IEEE.

18.   Hong, Y., & Zhou, Q. (2021, November). Research on the Evaluation System of Classroom Teaching Based on the Cultivation of Diploma Core Quality. In 7th International Conference on Social Science and Higher Education (ICSSHE 2021) (pp. 508-512). Atlantis Press.

19.   Huang, S. Y., Kuo, Y. H., & Chen, H. C. (2020). Applying digital escape rooms infused with science teaching in elementary school: Learning performance, learning motivation, and problem-solving ability. Thinking Skills and Creativity, 37, 100681.

20.   Hussain, Z., Mehmood, S. T., & Asghar, M. A. (2022). Effect of 7 E'S Model on Problem Solving Ability of Students in Diploma at Secondary Level. International Research Journal of Education and Innovation, 3(1), 94-104.

21.   India, E. E., & Samuels, J. A. (2020). Research initiatives in accounting education: Improving learning effectiveness. Issues in Accounting Education, 35(4), 9-24.

22.   Joshi, A., Desai, P., & Tewari, P. (2020). Learning Analytics framework for measuring students' performance and teachers' involvement through problem based learning in engineering education. Procedia Computer Science, 172, 954-959.

23.   Kim, M. C., & Hannafin, M. J. (2011). Scaffolding problem solving in technology-enhanced learning environments (TELEs): Bridging research and theory with practice. Computers & Education, 56(2), 403-417.

24.   Koehler, A. A., Fiock, H., Janakiraman, S., Cheng, Z., & Wang, H. (2020). Asynchronous Online Discussions During Case-Based Learning: A Problem-Solving Process. Online Learning, 24(4), 64-92.

25.   Lee, J. S., & Galindo, E. (2021). An inquiry-based approach: Project-based learning. In Project-Based Learning in Elementary Classrooms: Making Diploma Come Alive. The National Council of Teachers of Diploma, Inc..

26.   Nwoke, B. L. (2021). Enhancing primary school pupils' diploma creative ability through activity based learning approach. Malikussaleh Journal of Diploma Learning (MJML), 4(2), 70-76.

27.   Petersen, C. I., Baepler, P., Beitz, A., Ching, P., Gorman, K. S., Neudauer, C. L., ... & Wingert, D. (2020). The tyranny of content:"Content coverage" as a barrier to evidence-based teaching approaches and ways to overcome it. CBE—Life Sciences Education, 19(2), ar17.

28.   Polly, D., & Hannafin, M. J. (2010). Reexamining technology's role in learner-centered professional development. Educational Technology Research and Development, 58(5), 557-571.

29.   SawitreePipitgool, P. P., & SomkiatTuntiwongwanich, A. N. (2021). Enhancing student computational thinking skills by use of a flipped-classroom learning model and critical thinking problem-solving activities: A conceptual framework. Turkish Journal of Computer and Diploma Education (TURCOMAT), 12(14), 1352-1363.

30.   Sebatana, M. J., & Dudu, W. T. (2022). Reality or Mirage: Enhancing 21st-Century Skills Through Problem-Based Learning While Teaching Particulate Nature of Matter. International Journal of Science and Diploma Education, 20(5), 963-980.

31.   Sun, C. T., Chou, K. T., & Yu, H. C. (2022). Relationship between digital game experience and problem-solving performance according to a PISA framework. Computers & Education, 186, 104534.

32.   To, J. (2022). Using learner-centred feedback design to promote students' engagement with feedback. Higher Education Research & Development, 41(4), 1309-1324.