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RESEARCH ARTICLE

Developing Memory and Understanding Skills for Subject-Specific Knowledge Processing and to Face High-Stakes Exams: A Case Study

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ABSTRACT

University students possess different levels of language and cognitive abilities in gaining their subject knowledge and face tremendous challenges to get through the exams in distinction. The present education system expects the students to possess excellent subject knowledge and outstanding results in their exams. In light of this context, this paper attempts to address how students are engrossed in learning difficulties while subject knowledge processing and facing their examinations. Qualitative case study approach has been undertaken to analyze the language and cognitive skills of the students in memory processing of their subject knowledge to face the exams. Their language learning attitudes and preferences to apply memorizing and understanding skills while learning the course content are discussed. It is observed that adequate language and cognitive skills are essential to understand and process the subject content in memory. It is also found that both memory and understanding skills are necessary for gaining adequate knowledge on the subject and to retrieve the same while writing in the exams.

Keywords: Cognitive skills, Content memory, Knowledge processing, Language learning, Memorizing skills, Understanding skills

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تطوير مهارتي الاستدكار والفهم لتوظيفهما في اكتساب المعرفة الأكاديمية وأداء الاختبارات المصيرية: دراسة حالة

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الملخص

يمتلك طلاب الجامعات مستويات مختلفة من القدرات اللغوية والمعرفية لاكتساب المعرفة الأكاديمية، كما يواجهون تحديات عديدة لاجتياز الاختبارات. يتوقع نظام التعليم الحالي أن يتمتع الطلاب بمعرفة أكاديمية ممتازة وأن يحققوا نتائج عالية في اختباراتهم. في ضوء ما تقدم، تهدف هذه الدراسة لمعالجة الصعوبات التي يواجهها الطلاب أثناء اكتساب المعرفة وأداء الاختبارات. تم اتباع منهج دراسة الحالة النوعية لتحليل المهارات اللغوية والمعرفية لدى الطلاب في معالجة المعرفة الأكاديمية واسترجاعها عند أداء الامتحانات. تناقش الدراسة توجهات الطلاب نحو تعلم اللغة وتفضيلاتهم في تطبيق مهارات الحفظ والفهم أثناء الدراسة. وتشير النتائج إلى أن المهارات اللغوية والمعرفية الجيدة ضرورية لفهم واستدكار المادة التعليمية. كما توضح الدراسة أن مهارات الحفظ والفهم معاً تلعب دوراً أساسياً في اكتساب المعرفة اللازمة واسترجاعها أثناء أداء الاختبارات.

الكلمات المفتاحية: المهارات المعرفية، ذاكرة المحتوى، اكتساب المعرفة، تعلم اللغة، مهارات الحفظ، مهارات الفهم.

Introduction

Tertiary level classrooms are typically found large with heterogeneous mixed ability students. As far as English language learning is concerned, the language skills of the students are typically categorized into two broad learning levels – Strong English Proficiency (SEP) and Limited English Proficiency (LEP). The students who can competently use English can be referred to as SEP students and the students who possess limited language ability and are slow in language learning and are not able to confidently comprehend and communicate in English can be referred to as LEP students. In secondary and tertiary level education, the students with SEP face the exams by understanding the content, while the LEP students, face learning difficulties due to their lack of language proficiency and understanding ability, just memorize the content with or without understanding it. The present study attempts to probe the case of a tertiary level Technical English course in a state university of Tamil Nadu where the English teachers are liable to train the SEP students to achieve distinction and simultaneously to obtain 100% results, they aim at coaching the LEP students with compensating rote learning strategies to secure at least minimum pass marks in their end semester examinations.

In the present scenario of tertiary level education, students with good language and cognitive skills fairly apply deep approach to learning while the students with limited language and cognitive ability are more concerned to adopt surface approach to learning. As the SEP students are good enough in understanding and learning the language content, they can confidently face the exams, whereas the LEP students, due to their inadequate language and cognitive ability are not able to understand and use the language content. They stick on vaguely applying rote learning and content memorizing techniques to prepare for the exam. As students' learning approaches differ, and are more influenced by the restricted syllabus of high stakes exams, most students are confronted with the basic question – How to memorize a subject? Whether to memorize with or without understanding the content? Can rote memorization be replaced by reviewing the content? Can it be applied by the sense of inquiry? Do repetition skills help gradual memorization or understanding of the content? How do metalanguage skills affect memory processing? What is metacognitive learning? How content learning affects language, memory and cognition? The present study addresses these practical learning and understanding issues and probes developing relevant language and cognitive skills of the LEP students

for gaining academic literacy and to face high-stakes exams in their due course of study.

Background to the study

Educational practices underpin the necessity of content memory and language learning. Memory and understanding skills are crucial to determine the value of learning. The process of memorizing attributes for storing and retrieving the content. As the technicalities of learning encompass constructing knowledge and gaining academic literacy, it is crucial for the present educational practices to determine the interdependence and interrelatedness of language and cognitive skills. Several researchers [Au and Entwistle \(1999\)](#); [Darling-Hammond et al. \(2020\)](#); [Entwistle and Entwistle \(2003\)](#); [Huberman et al. \(2014\)](#); [National Research Council \(2002\)](#); [Noguera et al. \(2017\)](#); [Ramsden \(1997\)](#) explored the significance of memory with understanding the content for active learning. Typically, with or without understanding the content, rote learning strategies were dominated in the classrooms especially, Asian students practiced quick learning the subject to face the exams, ([Ali, 2003](#); [Sadri & Firouzi, 2017](#); [Sinhaneti & Kyaw, 2012](#)). Yet, the mediating role of language skills in developing cognition and understanding is perhaps one of the most demanding critical learning strategies that need to be practiced at every level of education.

[Au and Entwistle \(1999\)](#) discriminate the concepts of deep and surface approaches to learning. Deep approach to learning facilitates knowledge construction while surface approach to learning concerns the students to meet the tactics of examinations ([Gibbels & Dochy, 2006](#)). Students' understanding of the language and subject content remains to be a cognitive issue as they apply deep or surface strategies to learning. Distinguishing between learning with or without understanding, [Hilgard \(1948, p. 8\)](#) claims, "Some things we appear to acquire blindly and automatically some things we struggle hard to understand and can finally master only as we understand them". In discussing the belief and attitude of students towards memorization and learning English as a Foreign Language (EFL), [Oanh and Hien \(2006\)](#) distinguish the effect of good memorization and poor memorization. They discriminate the impact of memory with understanding as good memorization and the habit of memorization without understanding, blind by heart, rote learning and the inability to use the memorized content in the right context as poor memorization skills. Further, they elaborate the positive and negative influences of memorization

on students' performances and its effect on their learning behaviors and styles. As poor memorization encompasses memorizing without understanding, it proves to be a natural hindrance to real communication (Cross, 2010). Huberman et al. (2014) stress on acquiring good memorization and put more emphasis on to realize the impact of negative influences of poor memorization and to avoid it.

Higher education students are found to be keen on developing academic literacy and knowledge construction to achieve academic success. They apply direct strategies like memory, cognition, and compensation skills for gaining academic knowledge (Hoque, 2018; Klemm, 2007; Nasrollahi-Mouziraji & Nasrollahi-Mouziraji, 2015). To achieve academic literacy and success in exams, they need to comprehend, understand and produce original expressions of the thematic content with adequate language and cognitive skills. Students' learning attitude, preferences and styles and the perceptions of the academic environment and their influences on students learning skills varies according to different contexts (Entwistle, 1991). Students generally prefer memorizing as a strategy for developing their language and cognitive abilities (Chen et al., 2016; Khamees, 2016). Slow learners struggle for their limited language and cognitive ability, as they face the exams with or without understanding the content (Felder & Brent, 2005; Leung et al., 2006). Lujan and DiCarlo (2006) reflect on the students' attitude for memorizing the content and passing exams without understanding the text. LEP students due to their language learning difficulties and time constraint put little effort to understand the content and hence they are used to reading only exam related portions of the syllabus to get pass in the exams. Asian students are used to practice rote learning for memorizing vocabulary and scientific definitions (Chen et al., 2016; Sadri & Firouzi, 2017; Sinhaneti & Kyaw, 2012; Wu, 2014; Yu, 2013). Rote memorization, repetition, by heart and spoon-feeding techniques are consistently used for the immediate passing of the exam (Cook, 1994; Oanh & Hien, 2006; Ramsden, 1997; Robson, 2008; Wong, 2004). Students are more concerned about understanding the tactics of the exam and evaluation techniques, rather than paying much attention to understanding the syllabus content (Ali, 2003; Entwistle & Entwistle, 2003; Lujan & DiCarlo, 2006). The uncertainty of understanding the subject and the inability to produce the informative content during and after the exams is a matter of great concern that needs to be explored.

Most researchers discuss the present educational system and the importance given to teaching and learning only for the sake of passing the examinations

and not the skills that they really need to execute in both present and target contexts (Entwistle & Entwistle, 2003; Felder & Brent, 2005; Ramsden, 1997; Robson, 2008; Yu, 2013). The responsibility of the teachers are placed tremendously on to undertake coaching methodology for passing the exams and creating all pass results for which the students need only to memorize the subject contents. The students are also made focused to learn only to secure more marks in the exams and hence they are least oriented to understand the content. Rather investing good efforts in developing language and cognitive ability, students follow to memorize those often-repeated questions in the previous set of exam question papers to get through the tests. It is generally found that in present higher education, the students are deprived of both language and cognitive ability (Oanh & Hien, 2006; Özkan and Kesen, 2008). Ali (2003) discusses about the Malaysian students' limited understanding of the subject. As they are frequently encountered with the tests, they are not given enough time and space to sufficiently prepare for the subject with deep learning skills. They aim to perform better in the exam and pass the subject without sufficient understanding of the complete text. Hence, they lack adequate vocabulary and extensive reading skills to comprehend and understand the subject (Stoeckel et al., 2012; Tin, 2000). As their metalanguage and metacognitive skills are not complimentary, they generally lack language productive skills and hence, they widely commit grammar, spelling and punctuation errors (Atai & Nazari, 2011; Blanco et al., 2010; Kongpetch, 2006; Lam, 2009; Nassaji, 2011). While discussing on students' language difficulties in their oral and written performances, Murdick, 1996, 42) discriminates "competency errors derive from a lack of knowledge or ability, while performance errors derive from a mistake in language processing in the head". The transforming of language and cognitive skills and subject knowledge through speech and writing demand potential languaging skills (Swain et al., 2009). Languaging is the power of language to mediate attention, recall, and knowledge creation (Swain & Lapkin, 2011). It is attributed through metalanguage and metalinguistic skills, and subsequently, it can be developed through explicit language learning and exploratory practice (Bloom, 2007; Bosuwon & Woodrow, 2009; Hsieh, 2006; Hu, 2011; Rose, 2007; Swain et al., 2009).

Gijbels and Dochy (2006) reflect that the differences in assessment preferences are correlated with differences in approach to learning. They point out how the present assessment system has made the students face difficulties in promoting deep learning strategies. Oanh and Hien (2006) discuss the

teachers and students' beliefs about the inventory of memorization in the process of language learning. It is analyzed that though memorization is crucial for learning, understanding the language and content is equally important to put their cognitive insight on knowledge construction (Khamees, 2016; Özkan and Kesen, 2008; National Research Council, 2002; Nel & Müller, 2010). Au and Entwistle (1999) addresses about 'the paradox of the Chinese learners' and relates it to the concepts of memorization and understanding with the strategic approaches to learning. Though the Chinese learners indulge in rote memorization activities, they are gradually found to adopt appropriate explicit learning strategies for the successful completion of the course.

The deep approach to learning, widely recognized as memory with understanding has been the focus of interest in recent educational studies (Au & Entwistle, 1999; Darling-Hammond et al., 2020; Huberman et al., 2014). This has provided many research insights to understand how learning approaches affect memory and cognition (Entwistle, 1991; Entwistle & Entwistle, 2003; Noguera et al., 2017; Oanh & Hien, 2006; Ramsden, 1997). As the students are preoccupied with the target to get higher education and work placements, they are liable to face high-stakes exams. Hence, they are deemed to develop content memory and understanding skills to learn the questions that are like those on the exams. As memorization and understanding is the core process for developing content knowledge, the twenty-first century student community needs to be specifically obsessed to develop adequate metacognitive learning skills and higher order thinking skills to adopt a deep approach to learning for professional and social communication.

Research design

Study design

The process of deep learning to develop memory with understanding skills can be investigated through both qualitative and quantitative approaches. To identify and address the cognitive and language learning issues of the students, probing through qualitative research is more feasible. Qualitative research helps to observe, discuss and analyze the learning experiences of the students. It promotes experiential learning and holistic understanding among the researcher and research participants. In relevance to probe the language and cognitive skills of the students, a case study approach is more viable as it can be more practical and realistic to undertake a random sample of the students and to specifically investigate

their learning experiences in a specific context. This research study essentially employs a qualitative case study approach to analyze the language and cognitive difficulties of the students while learning (Iannone et al., 2020). It is also espoused with ethnographic methods to intensively examine the academic culture and elicit the emic and etic perspectives of the participants (Flick, 2014; Krupat, 2023). The emic and etic perspectives are the immediate insights of the insiders and outsiders understanding of communicative events, and their narratives reflect how their participation and contribution have affected the research study. The experiential views of the participants expounded in formal, formalized informal, informalized formal discussions and casual interactions are instrumental in understanding the academic, behavioral, cultural, social and situational contexts of the study. The administration of interviews, classroom observations and group discussions in both formal and social contexts help to analyze the personal and learning experiences of the participants and their free responses proves to be an evident research tool in probing the present case study.

Research question

The following research question is put to enquiry to understand the learning experiences of the LEP students in preparing for high-stakes exams. It focuses on relating the process of languaging and cognition in developing language, content memory and understanding skills of the students.

- How do content memory and understanding skills affect LEP students in preparing their academic high-stakes exams?

Context and course of the study

This paper reflects on the research conducted in developing language and cognitive ability of the first-year engineering students learning Technical English course at King College of Technology affiliated to Anna University in Tamil Nadu. This university provides Technical English courses in the first and second semester of the first year of engineering program. Technical English is an academic literary course that aims at making the students to enhance effective English communication skills for academic and professional purposes. This language course is taught with a vast package of technical content, including grammar, vocabulary and functional writing in technical contexts. The Technical English course is generally specified with the structural and functional objectives of language teaching. Though the course

aims at participative learning to acquire communication skills, most students indulge in applying rote learning skills for exercising classroom tasks. As the students lack adequate language and cognitive skills to understand the content, they rely on rote learning, and this extends to their written examinations too. To address this gap in their learning, the present study has specifically considered the cases of low proficiency students and the slow learners and treated them with ethnographic research tools to elicit their language and cognitive problems.

Participants

The key players this study is first year Electrical and Electronics Engineering (EEE) students, including the researcher and three other faculties of the English department. In the student participants, a total of 44 first year EEE students with 39 males and 5 females participated in this study. The average age of the students is 18. The total strength of the EEE class is 44 and all the students were randomly undertaken to get involved in the study. It was a mixed level class with different cognitive and language levels of low, moderate and high proficiency. The students were not categorized to their levels of proficiency as the present researcher considered that there should not be any sort of disparity to be shown to the proficiency level of the students, and they should be equally treated throughout the study. The researcher, being the active participant and a language faculty in the department, had a consensus with the other three language faculties that with a mixed level classroom setting, all the students will be treated uniformly without creating any specific groups on their differences in language and cognitive abilities. The researcher and the language faculties collaborated to scaffold and examine the language and cognitive difficulties of all the mixed level students. All the language faculties had more than five years of professional experience in teaching Technical English courses. With informed consent, participant personal identification is kept confidential and referred with anonymous titles.

Procedures

Qualitative research is employed as it is more feasible to analyze the emic perspectives of the students and language faculties. Their personal reflections, classroom observations and group discussions reveal their pedagogical constraints, learning deficiencies and expected instructional practices to meet the purpose of language learning. This study employs an ethnographic approach to describe the subjective re-

flections of the students' learning behavior and issues of the academic culture. As this research attempts to conceptualize the languaging and cognition process of learning, it employs interviews, classroom observations and group discussions as the research methods to understand the personal reflections of the participants. With the continuous free responses of the participants, this study explores how to analyze the content memory and understanding skills of the LEP students while facing their academic high-stakes exams. The authenticity of the conduct of research can be noted through the research setting, as the present study is conducted in an academic context and the participants are the language faculties and students of the institution. A meeting was held with the students, English faculties and the research committee of the institution to seek an informed consent and approval to undertake the research in academic settings. The research ethics were essentially followed to maintain the confidentiality and decorum of the participants, and the proceedings of the research were also briefed to them so that they could acknowledge the impact and outcome of the research. The credibility and validity of the research can be examined by understanding the identity of the research problem and analyzing how it has been addressed in a classroom environment. The involvement of the research participants, including the researcher, and their different perspectives and experiences shared in interviews and discussions in the entire research helps to recognize the scope and significance of the study undertaken. Though the research problem is investigated in a typical classroom environment, the relevance of the language and cognitive issues of the students can be identified with any broader contexts of any academia and can help to provide more scope to conduct future research in this discipline.

Data collection and analysis

The whole class of 44 students is divided into a total of six groups with 7 members each in four groups, and 8 members each in two groups. To engage the students for their collaborative learning and to facilitate peer interaction, all the groups are comprised with the mixed ability students. As this classroom research is much based on the emic perspectives of the students and English teachers, their personal reflections on cognitive learning and understanding are observed throughout the research. Their subjective reflections in unstructured interviews and group discussions are particularly found to be useful in understanding their personal inhibitions and academic culture. Classroom observations are taken as field notes to analyze the comprehensive ideas of all the students in the class.

Their views on content learning, poor memorization, lack of memory recall and content retaining, and language learning deficiencies are specifically observed. Informal discussions with the students inside and outside the classroom; informal chats in leisure hours and student counselling meetings helped to identify their language and content learning difficulties in preparing for the exams. Unstructured interviews were periodically done during the end of the week and counselling meetings were undertaken fortnightly for a stretch of continuous four months and the evaluation of quizzes and midterm examinations happened throughout the whole semester. Integrated assessments of both SEP and LEP are done. Coding and thematic analysis was undertaken through the excerpts collected during all the interviews, discussions and meetings. Students' fluctuating levels of memory and understanding during and after the tests are specifically examined through individual and group interviews. With subsequent observations in interviews and students' performances in oral and written tests, it is conceptualized that the level of understanding the language and content needs to be improved.

Findings and discussion

Tertiary level educational system is very typical in fostering idealistic learning. As most of the classrooms are engrossed with mixed proficiency level students, it is generally found difficult to provide sufficient systematic training to LEP students, in particular. The reason behind creating the group with mixed ability students is to make the students get motivated through peer learning. As the formative assessments are held frequently, examinations are the means to check memory rather than to ensure knowledge on the subject. In the classroom observations, it is commonly noted that students acquire a varied level of language and cognitive resources. SEP students are found to be confident and self-assured in preparing for examinations. As they can read and comprehend the subject, they generally prefer to memorize and understand the content while preparing for examinations. They are also found to be comfortable in facing both objective and descriptive questions; overt and covert questions and to the detailed questions that are relevant to the syllabus.

LEP students are found to be uncertain and hesitant in facing the exams. In the unstructured interviews, LEP students reflected their learning difficulties and their inability to understand the content. They reflected that they are unable to read and comprehend the subject. They shared that they just rely on content memorization of those frequent items asked in the

previous year question papers. As language testing is crucial to acknowledge the knowing and understanding of how the student has really achieved in the exams, the students are well adapted to apply spoon-feeding approach to learning (Balloo et al., 2018). They revealed their limited language and expression skills and how it affects their cognitive learning. As they are insisted to cope with the examination needs, they experience more learning difficulties in understanding both language and content. Unbiased with the frequent conduct of examinations, most students reflected the need for preparing cycle tests than for understanding the subject. Almost all the students asserted the priority of testing and how it has influenced their rote learning process. Some examples of their comments appeared as follows,

Examinations have become part of the daily timetable schedule. Teachers provide the questions prior to the test so that we should be familiar with the important questions, as well as answering those questions thoroughly. As we are preoccupied with tests and time, we are more inclined to memorize answers only to those questions. We don't find sufficient opportunity or patience to read and understand the whole text.

(EEE Student.6)

Frequent conduct of testing has been imposed for scoring better in the university exams. Though we find it hard to face daily tests, it helps us on reading and memorizing the subject systematically.

(EEE Student.14)

Teachers expect us to achieve more marks through making us learn specific questions only. As we are bound with the specific questionnaire, we have to read those questions to answer in the exams. This is how they coach us intensively on selective reading.

(EEE Student.16)

We face daily tests in the first period. If we fail the test, we need to write retests the very next evening, after the classes are over. To compensate for the failure marks, we need to write assignments too. So, it is better that we pass the tests at the first appearance. Anyhow, we must read the subject by memorizing the content.

(EEE Student.29)

When asked about their learning preferences, the LEP students emphasized that they are convincingly happy to follow rote memorization skills and by heart techniques. They tend to memorize the content with or without understanding the content to get through the exams. It is obviously seen that though the students pass the exams, they are not able to express their informative knowledge in the concerned subject. In the interviews, the students confessed that

they just depend on rote learning with selective intensive reading skills; repeating and memorizing the content; and referring and revising previous year question papers for facing the exams. By scrutinizing and adopting some instant examination and evaluation techniques, they simply try to get good scores in the subject. In this context, EEE Student.12 reflected the importance of content memorization for getting more marks in their end semester examinations,

We plan for getting good results, as it is the eligibility criteria for seeking admission in higher learning or getting jobs. We need to qualify for the heavy competition in the job market. So, we memorize the answers to the questions given in the previous question papers.

Due to academic pressure and constant product orientation, formative testing is repeatedly conducted in the form of daily tests, retests, unit tests and model tests. As the students are liable to show their outcomes in learning the course and to achieve better in their high-stakes exams, they are often found to be restricted to learning the content with or without understanding the subject. Through the subsequent interviews held with all the students, it is quite interesting to note that generally the students do not perceive any difficulty in memorizing. Their adoption of rote memorization skills pervasively used in school culture is gradually extended to college education too. But the real problem persists when they are not able to understand the content. Most students confessed that their level of understanding of the content needs to be improved.

Classroom observations and discussions are undertaken to identify the language and cognitive abilities of the LEP students. Involving all the students along with all the faculties of the English department fosters participative learning as it facilitates all the stakeholders in bringing them together with team spirit and understanding. Further, it envisages mutual concern of teachers and students in organizing and contributing much to experiment the process of cognitive learning. As they are instrumentally motivated to achieve in exams, they are more inclined to adopt cognitive approaches to learning. They tend to adopt the skills of memorization and repetition and are eager to share their learning experiences with both peers and teachers. In classroom observations, it is noted that LEP students struggle to retain the memorized content. Due to by heart techniques, they can recite what actually is available in the text, but if their memory level fades, they are unable to retrieve the information from their mind as the subject data is completely erased due to inadequate language and cognitive skills. In this context, Language Faculty.2

revealed the significance of linguistic and cognitive skills for comprehending the subject,

The challenge in recovering the language along with the subject knowledge is really a daunting task to them. They never try to put their ideas and understanding on the subject. If the memory is erased, they are not able to cope up the situation. They neither know the subject nor the language to interpret it.

Further, when asked about their level of memory storing and retrieval standards, LEP students felt that they needed to retrieve the content even after the exams. They assumed that the information needs to be stored in the brain. If the content is understood, the process of storing and retrieval of data from the memory can be seemed at ease. But most of the LEP students are found neither good in memorizing nor understanding the content. EEE Student.21 admitted that their level of retrieving the information is found to be increasingly less due to their poor memory and retaining skills,

Due to the immediate conduct of exams, we adopt selective reading of the important questions. We secure good marks even without understanding the content, but we are not able to recall the content after the exams.

When the LEP students are asked about their memory retrieval process, they reveal their uncertain state of oblivion. In the classroom discussions, most students claimed that when they are not confronted with the same topic or theme, they tend to forget the content they have learnt. Only when there is a need, they can process their memory to store or update the information. Otherwise, they generally forget it. It is obviously noted that the stored data is erased from the memory. EEE Student.23 confessed about the reality that students encounter in their exam culture,

When we are not encountered with the same thematic content, we may tend to forget it. That is why, we retain the content till the exam. When the exam is over and when we don't read the subject, we use to forget it.

It is also commonly observed that to compensate storing the data with or without understanding, repetition skills are practiced. As the present language system is endowed with idealistic learning, the students are well prepared to learn the subject through repeated reading of the text, till they store the data in the memory. With these repetitive and rote memorizing skills, the students were able to retrieve the content at the time of exams. And even at the time of want and demand, they can recover the content. EEE Student.39 reflected about their surface learning experience through repetition and recollection,

Even without understanding the content, with the repetition skills we may be able to recollect the content in nearby future. Though we are not able to understand the content completely, we are able to revise the information through noting important points. We need to remember the points to comprehend the subject.

In analyzing the students' perceptions on their memory recall, it is observed that when the students are forced to retain their memory skills for recollecting information at desirable situations, they are able to make it even without understanding the content. It is also proved that when the students are not able to understand, they compensate this deficiency with improving the skills of blind repetition. In the classroom observations, it is also noted that sufficient repetition of the thematic content fosters memorizing skills and at times, it instigates the students to gradually understand the content. Most students claimed that the process of repetition is quite helpful to revise and recollect the information.

In the classroom discussions with the students, it is commonly revealed that LEP students prefer memorizing to understanding as they lack linguistic and thematic knowledge to understand the subject. They lack in originally preparing the content as they lack adequate language, thematic information, planning, organizing and cohesion skills. In the formal and informal discussions, when asked about their need for understanding the theme and content to produce original expressions, most students claimed,

We need to understand and study. If we just read and memorize, we cannot answer all the questions, we need to seek reason and understand and stick to the content, format and presentation.

(EEE Student.27)

We need to critically think and know the theme to develop the core points with paragraphs. It is unwise to memorize selective passages as we cannot expect the same topic in the exam.

(EEE Student.19)

LEP students take the shelter of memorizing the rules with little understanding and so they are not able to put their "known rules of language" to even in discrete parts as they are often grasped with forgetting and fading memory. In the classroom observations, it can be also found that there are few exceptional SEP students who are very consistent in transforming rules to actual practice. They are able to make up error free sentences and construct new sentence patterns with their sheer linguistic and cognitive knowledge, but this situation is not found to be true with all the students. LEP students are engrossed with the typical language errors, and they

feel for their inconsistency in displaying communicative competence. In the classroom observations it can be widely noted that LEP students are generally always facing these language and cognitive issues. Their knowledge of vocabulary is found to be very little, and they are least bothered to refer dictionary for understanding the content. They feel that it delays their reading skills as they are often interrupted in their blind repetitive reading process. So, without understanding the meaning of the word, they simply memorize the content. Hence, it is implied that the LEP students need to develop vocabulary and extensive reading skills. With a good repertoire of verbal knowledge, they need to be consistent to develop and practice the ability of memorizing with understanding and to apply appropriate learning strategies to achieve in their exams.

Learning grammar is not only memorizing the rules, but students need to understand to use it extensively in both speech and writing. For vocabulary too, they cannot vaguely memorize the words but need to understand to put in contextual use. Memory with understanding is crucial for the students to learn and understand the language and content. Again, for functional, compositional and transactional writing, they need to follow strategic approaches along with memorizing and understanding the subject. The overall positive view of the students on understanding revealed their specific concern in developing language skills for comprehending the text. Cognitive and academic language skills cannot be developed unless the student understands the language and content. In classroom discussions, most students felt the need for understanding both language and subject content. They assumed that they needed to use the language items in real communication. They realized that the purpose of language study is not only to face the exams but to use it in real situations. As far as the importance of language is considered, most EEE Students affirmed,

If we want to learn only for exams, then we can memorize and vanish the stuff. Our aim is not merely passing the subject, but we need to use the language. So, we need to understand and store it in our memory for further use.

(EEE Student.6)

We need to express ourselves. We need to provide proper information. We should be able to produce relevant ideas with good content and language. Sometimes our language will be good, but it may lack sufficient information. Sometimes we are informative, but struggle for language. So, language and content are important for good communication.

(EEE Student.35)

Language faculties contemplated the view of the students and suggested they use the language for meaningful communication. They insisted that the students need to read, critically think, plan and prepare the subject. On discussing the factors for the capability for understanding, language faculties stressed reducing the amount of information as the LEP students can be better relieved from heavy stock memorizing. They expected them to critically think, interact and actively involve in independent learning. Language Faculty.3 asserted that students' cognitive skills need to be exercised to understand the informative content,

As they memorize without understanding, they are not able to think and write. Again, the students who are eager to understand and learn, they may be able to perceive and think, but still, they need to cultivate their skills for self-preparing, planning, organizing and presentation. Moreover, they need to be familiar with sentence construction and vocabulary. When they attempt to write originally, they lack logical coherence and intended expression.

Students with their innate skills will be able to produce sentences of their own but the problem persists with their inconsistent efforts in using metalinguistic terms in real language use. As far as the perspectives of the students are analyzed through classroom observations, discussions and subsequent interview data, the findings suggested that the students need to use the language to understand as well as to reproduce the content. And again, being a language is the prime component of memory processing; they need to practice it for understanding and communicative purposes. Further, they need to develop memorizing with understanding skills and should aim at developing both deep and strategic learning for their theoretical and practical application of their studies. It was found that LEP students need to have a consistent grammatical and semantic understanding of the subject they have learned. Students are continuously counseled to develop their languaging skills, and sufficiently given practice to use it implicitly.

Cognitive skills are relatively important in reflecting both syntactic and semantic elements of language. Memory with understanding will act as an aid in the production of language and it stimulates both implicit and explicit learning. For the better orientation of interactional communication in academics, profession and survival, cognitive skills like perceiving, observing, thinking, understanding, reasoning, analyzing and memorizing needs to be exercised through receptive and productive tasks. As most students are found to be confined in just reading the selective content, Language Faculty.1 continued that the LEP

students adequately lack extensive reading and comprehending ability,

They lack 'understanding' and 'interpreting' skills. They are given profound practice to intensively read the subject content relevant to exams. Hence, they seldom practice extensive reading and obviously, they lack reference skills too.

While addressing students' capabilities and their performances in written tests, language faculties asserted that with sufficient practice of language and cognitive skills, the students can be able to produce adequate information on the subject. It is anticipated that with their sheer knowledge on reading and comprehending the subject, they can develop innovative ideas and knowledge construction abilities. The findings of this research study suggest that memory with understanding could be an effective learning approach for active memory processing and understanding the content while facing high stakes examinations.

Implications and conclusion

The free responses of the students reflect that they are really intended to adopt understanding and comprehending ability. Their grievances for forgetting the content or their inability to retrieve the content after the exams suggest that they are much more oriented to develop strategies for deeper and conscious learning. While they are inclined to use rote memorization, blind by heart techniques, and repetition skills to develop memorizing, they do realize that without understanding, they are not able to confidently express the information on the concerned subject. Their regrets for not being able to understand the content imply that they have sought enough awareness and interest to attempt languaging and metacognitive skills. Their reflections on language and memory with understanding as a tool for effective communication, further strengthens their view that they need to improve language and cognitive skills for conscious learning and gaining academic literacy. The findings reflect that the students need to understand the content for easy memorizing and recall for writing in the exams. As subject content needs to be memorized with understanding, and for further information storage and retrieval process, it is implied that the students need to follow these critical learning strategies to prepare well for examinations –

- Improving language skills: With the ongoing discussions held with the students, it is observed that language mediates cognition. The notion of

applying language skills to understand the content reflects that the students need to develop both syntactic and semantic understanding of the language and content. This will gradually help them to identify and understand the form, meaning, and use of language components.

- Improving conscious extensive reading skills: Mere mechanical mode of reading implies rote learning, but when the students make effort in consciously reading the content, they could envisage the importance of critically understanding the text. Further, it provides insight to develop thinking, comprehending, paraphrasing and interpreting skills to foster language, memory and cognition. This will help them to develop their cognitive abilities to engage in deep, conscious memory processing and information transfer activities.
- Improving critical thinking skills: Students need to develop explicit and implicit learning and understanding skills and to be very much motivated to indulge in the critical analysis of the subject. They need to self-equip themselves with critical learning ability and exercise more in critical knowledge construction activities to comprehend and evaluate the subject they have undertaken.

The present educational practices should revamp knowledge construction for contextual applications and should help the students to understand the subject and put it in memory for both achieving in exams as well as in practical use. The active processing of memory needs to be sustained through sufficient understanding of conceptual information, and it needs to be procured in any given situation, space, and time. As high stakes examinations are overruling the destiny of students, future research can be undertaken to investigate students' learning experiences in developing their language and cognitive ability and in exercising higher order skills like extensive reading, reasoning, critical thinking, understanding, content memorization, information retention, presentation and interaction in the process of teaching, learning, and evaluation. This will help the national educational planning commissions to revise the quality of learning on par with the standards of global education.

The limitation of the present research is that it is a small-scale intensive study with a total strength of 44 students only and was not extended to examine the whole of the institution. As the present researcher, and other language faculties promoted active and performance-based language learning and monitored their participation, students were very conscious to develop their language and cognitive abilities. If the

continuous prompting of the teacher and the students' self-urge to learn and use English for content understanding is missed or lacked, the students may not be able to engage in deep learning processes. Being this study provided intensive care to the benefit of the limited number of students, a large-scale study with the participation of hundreds of students with few or even just one faculty to examine their long-term development of language and cognitive abilities is doubtful as most of the time our Indian teachers generally reflect their grievances in handling big classrooms.

Ethics statement

This study was approved by the Research Ethics Committee (REC) and was performed in accordance with the ethical standards of the Institutional Review Board, King College of Technology. Informed consents were obtained from all the students and faculties to participate in research.

Conflict of interest

There is no conflict of interest.

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Author contribution

Jabbar Al Muzzamil Fareen, being the sole author of this paper has conceptualized, analyzed, drafted, reviewed and revised the paper.

Data availability

The datasets analyzed during the present study are available from the author on request.

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Appendix A: Open ended questionnaire for analyzing the language and cognitive needs of the first year Electrical and Electronics Engineering (EEE) students

Name of the Student :

Name of the Institution :

Branch & Year :

Date :

1. What are the different language and cognitive problems students face while learning?
2. Why the students are not able to easily understand the subject?
3. Why the students indulge in rote learning to face the exams?
4. How can the students adopt deep learning effectively?
5. How can the students improve their content memory and understanding to face the exams?

Appendix B: Open ended questionnaire for conducting unstructured interviews with the Language Faculties

Designation :

Name of the Organization with address :

Educational Qualification :

Professional Experience :

1. What are the different problems students face while facing high stakes examinations?
2. How are language abilities found in different levels of the students?
3. How language abilities help in understanding the subject?
4. How can the students retrieve the subject knowledge in the exams?
5. How can the students be facilitated to develop their memory and understanding skills?