



**DIAGNOSTIC STUDY ON THE TEACHING OF TECHNICAL ENGLISH IN ENGINEERING: A
CASE STUDY OF JNTUK-AFFILIATED COLLEGES IN BAPATLA DISTRICT,
ANDHRA PRADESH, INDIA**

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ABSTRACT

The current study aimed to assess the efficacy and efficiency of Basic Science and Humanities (BS&H) Technical English programs offered by JNTUK-affiliated colleges in Andhra Pradesh's Bapatla districts during the academic year 2022-2023. The approach was based on the analysis of data gathered from surveys administered to a simple random sample of fifty students from the three engineering colleges located in Bapatla Mandal. Because most of these stories are published in English, most students who responded to the survey believe reading English will help them keep up with current events in their field. These findings suggest that the new curriculum should include and reinforce this receptive skill using the strategies outlined. Along with emphasising the importance of reading, the new programmatic design of JNTUK-affiliated colleges 1 and 2 should consider receptive skills and comprehension. It is recommended that the same combination be used for JNTU Affiliated colleges -3, but to improve writing skills in mind. One of the most significant findings is the importance of incorporating Internet use into technical English classes.

Keywords: needs assessment, Technical English teaching, curriculum reviews.

INTRODUCTION

Nowadays, one of the universities' commitments is the preparation of professionals capable of working in increasingly complex environments in social, economic and environmental conditions whose dynamics demand high levels of flexibility, transparency and new skills, such as those required for teamwork and permanent self-learning. To do so, it is essential to keep the curricula and educational processes of their Academic Programs updated and appropriate, both to the scientific and technological advances of the professions and to regional, national and international needs [1].

This programmatic update and adaptation require a constant diagnostic evaluation to detect and correct those aspects that need to be adjusted and modified according to the reality of the classroom, where students and teachers interact with learning. This way of proceeding allows not only the confrontation between the ideal established in the design and the reality of the classroom but also contributes to the permanent enrichment of the programmatic redesign [2].



Another of the necessary conditions for universities to be able to fulfil their commitment to training capable professionals is to have an academic community with knowledge, awareness and critical capacity regarding their professional practice as university professors and with a disposition towards the study, adaptation and construction of transformative alternatives and new educational practices within the framework of specific projects. In this order of ideas, the present research intended to diagnose the effectiveness and efficiency of the current Technical English programs of the JNTU Affiliated colleges for the Basic Science and Humanities (BS&H), specifically of the JNTU K affiliated college-1, college-2 and college-2.

This task involved the teamwork of professors who make up the Technical English faculty of Acharya Nagarjuna University affiliated colleges. This team is committed to the development of a permanent, systematic and institutional research process related to the curricular aspects of engineering education and its environment in order to contribute to the updating and adaptation of the programs in this area, under the new learning theories that take into account the student as the axis of the process.

Consequently, the present diagnostic study is based on the needs of the engineering students at the above colleges to learn the English language. The fact that they start from their academic needs and interests will ensure a programmatic design with guidelines for the cognitive and instrumental preparation of the English language and the effective interaction of the teacher with the students.

1. Regarding the current Technical English Programs taught at BS&H

The redesign of Technical English programs in Engineering must be oriented towards the professional training of the 21st-century engineer, with a scientific-technological tendency incorporating the changes derived from the transition from a post-industrial society to a knowledge society. This trend is closely related to the development of educational philosophy and its global context of influence on the socioeconomic policies and trends that guide it. In this way, a new theoretical foundation for the redesign of study programs must be based on the following contextual requirements set forth by Ertugrul et al., (2020) [3]:

- The new demands that sociocultural and economic transformations pose to education.
- The knowledge revolution in the “information society”.
- The role of new technologies and technological development.
- The new characteristics of the world of work and the occupation training requirements.
- The competencies required for job placement, career maintenance and development, and
- The urgency of solid, flexible training in the face of change.

These demands mean that the reform of study programs represents a significant percentage of the university transformation. The redesign of the Technical English programs does not escape these requirements. To do so, it is necessary to note that the teachers in charge of designing the Technical English programs must understand the characteristics of this language in order to treat it as a subject of study that forms part of the information and training that an Engineering student receives [4].

In this order of ideas, the diagnostic study carried out for redesigning the Technical English Program at BS&H investigates topics related to the curricular aspects that include the professional profile of the graduate, the design of programs based on competencies and the transversality of the curriculum. Likewise, the effectiveness of technological innovations related to the advantages of teaching English through the Microsoft Encarta Encyclopedia and the Internet is determined as instructional media per the new communication and



information technologies. Finally, aspects related to the difficulties of reading comprehension typical of scientific-technical discourse are included since the latter is the type of discourse used by the population subject to this study.

1. On the professional profile of the engineering graduate

The profile of the engineer graduated from JNTUK, as stated in most of the reviewed pens:

“must correspond to an individual prepared to interpret the region's reality, the country and its insertion in the global world economy. His development will take place mainly in technical areas but also in the administration of resources and the management of productive activity. They must function in the context of Indian society and its relations with international markets without leaving aside the sense of solidarity for the common good and respect for the values of the human beings with whom they interact [4].

According to these assertions, the engineers of the future must act and give efficient and effective responses to the transformations that arise from the rapid advance of all the processes that shape and encompass today's society, having to face great challenges and challenges both in the technical and human spheres, all in order to satisfy their ideals of service to humanity in general and to their community and work environment in particular.

With regard to their relations with international markets, it is essential that the engineer handles English in an instrumental manner since it is considered the common language used in the scientific-technical world. Learning this language, as mentioned in the preceding sections, will allow you, among other things, to be aware of the latest events that arise in your area of interest, and in this way, you will be able to stay in touch and insert yourself in the global world economy.

In conclusion, the review of the professional profiles of any university area becomes a guiding variable of its own curriculum since it creates the necessary conditions of social and academic relevance for the benefit of the competent training of its graduates. That is why the curricular designs must be based on programs based on competencies, which are supposed to be the ability to learn, innovate, and communicate what has been learned.

2. About the programs based on competencies

Competence is defined as the possession and development of knowledge, skills and attitudes that allow the subject who possesses it to develop activities in his professional area, adapt to new situations, as well as transfer - if necessary - his knowledge, skills and attitudes to nearby professional areas. It integrates the capabilities to develop work functions and situations at the level required by the job. It includes the anticipation of problems, the evaluation of the consequences of work and the possibility of actively participating in improving one's activity [6].

Based on these approaches and the redesign of the Technical English Program based on competencies, it is necessary to propose new objectives aimed at combining different experiences based on the four fundamental knowledge required by this conception: being, knowing, doing and living together (Rosales, 2004). These four knowledge related to the training of future engineers in learning English will be represented by being a professional capable of extracting and interpreting specific information in the foreign language, knowing how to solve problems in the language that is in the process of learning to make communication between peers from other latitudes flow effectively and efficiently, and in this way being able to live together in a harmonious and up-to-date manner in the global village of knowledge that surrounds them as an environment.



3. On curricular transversality

The concept of transversality exhibits a structural complexity with significant implications in the organisation of the contents because educational content must be introduced once a curriculum structure has been decided, taking the disciplinary areas as axes. The practical implementation of the concept of transversality would lead to important modifications in the curricular organization, whether in the area of the contents, in the schedules, in the participation of the educational community or in the compartmentalized structure by specialities.

In the specific case of the redesign of the Technical English programs in the Engineering curriculum, these contents must be conceived as axes that cross the curriculum vertically and horizontally, so that, around them, the topics of the different training areas are articulated with the objectives and contents of English. This articulation that runs through the curriculum in a diachronic and synchronous way allows the student to visualize the unified knowledge and find pertinence, relevance and importance to the contents acquired by other subjects that make up their study plan [5-6].

4. Regarding technological innovations

The role of 21st-century education must have as its goal the formation of individuals capable of using and managing the information and knowledge available in cybernetic media, especially those that are presented in English, which has been conceived as the world language to spread scientific and technological knowledge.

Due to the relevance of training engineers in managing these computerised media, redesigning the Technical English Program for BS&H must pay attention to such training. Although activities related to managing digital information through the computer are included, they are not part of the objectives contemplated in the current program. Based on this concern, the activities carried out by engineering students using educational software and the advantages that the Internet would provide for teaching English are analysed below.

a) Teaching English through the Microsoft Encarta Encyclopedia: According to the study by Lang, Michael. (2006).[7], many options create and recreate interactive learning through the Microsoft Encarta Encyclopedia. These include information search options, information processing options, complementary activities, and update systems. Even though this study was directed only to the JNTUK College of Engineering, according to the conclusions of this author, the use of Microsoft Encarta constitutes a pedagogical contribution that helps to interrelate the objectives and contents of the English for Specific Purposes courses, with interactive activities that lead to significant learning. The above contributes to increasing the motivation to learn English [8].

Consequently, the entire population subject to the research was surveyed on the relevance of continuing to use this educational software to reinforce the knowledge acquired by students in the theoretical classes of Technical English in the rest of the Colleges that make up the Faculty of Engineering at JNTUK.

b) Teaching English through the Internet: Suputra, Dwi. (2021) [9] highlights the advantage that the Internet offers by providing texts in electronic books and magazines, Web pages, e-mails and digital newspapers with which the student can develop reading skills in English. According to this author, when the Internet is used as an instructional resource in the teaching-learning process of Technical English, it is called learning based on Web technology since the development of Information Technology and the Digital Revolution have caused a new orientation towards teaching this subject.

The above refers to the mandatory inclusion within the redesign of the Technical English Program for Engineering, objectives oriented to developing reading skills through the Internet. In this way, the student will



not only be able to have different updated sources of reference to carry out research work related to his career but will also be presented with another category of texts in which he will exercise his reading comprehension in English: hypertexts. 5. On reading comprehension difficulties

The latest research carried out by the Technical English department at BS&H on the reading comprehension difficulties experienced by students of this Faculty of Engineering when processing scientific-technical discourse includes problems with translation, understanding cohesive elements and analysing texts critically.

5. On reading comprehension difficulties

The latest research by the Technical English Department at JNTUK colleges in the study area on the reading comprehension difficulties experienced by students of this Faculty of Engineering when processing scientific-technical discourse includes problems with translation, understanding cohesive elements and analysing texts from a critical point of view. Below is a brief description of what these reading comprehension problems are about.

a) Scientific translation: Translation as a teaching technique for scientific-technical English is conceived as a reading strategy that helps engineering students mitigate the comprehension problems they encounter in this foreign language. The recent studies by Rietveld, Laurent. (2019) [10] demonstrated the relevance of incorporating specific translation techniques in English programs, particularly for semantic-lexical elements such as the chain of noun modifiers, technical and sub-technical vocabulary, inconsistent use of the passive voice, and definite and indefinite articles, among others. Although the aforementioned study was carried out at the JNTU Affiliated colleges -3 of the Faculty of Engineering at JNTUK, some translation techniques will be proposed in the new program design.

b) Cohesive elements of scientific-technical discourse: The elements of cohesion within the structure of scientific-technical text constitute another aspect that causes reading comprehension difficulties for BS&H students. It has been the subject of countless discussions, studied by text linguistics, and developed by Halliday's textual model of systemic-functional grammar. Laxon et al. (2010)[11] define cohesion as a relationship of meaning between the linguistic units that form part of the language system. These authors also consider cohesion to be a semantic relationship, but it is carried out by lexical-grammatical means.

The results of the research carried out by Subramanian (2021) [12] showed the influence that cohesion has on the processing of information in written texts and at the same time, indicated that, in addition to cohesion, other factors also intervene decisively in reading comprehension, such as prior knowledge of the topic of the reading to be analyzed and the lexical competence of the reader in the English language. Since these cohesive elements are determinants in the overall understanding of the text, they were also subjected to the scrutiny of the respondents.

c) Critical Reading Process: In this sub-section, the work carried out by Suzanne, Nina. (2016) [13] on managing reading in English from a critical point of view is worth mentioning. Among the definitions extracted from the work of this author regarding critical reading, the following stand out: (1) the process of making judgments in reading: evaluating the relevance and suitability of what is read..." (2) an act of reading that uses a questioning attitude, logical analysis and inference to judge the value of what is read according to an established standard. Among the skills identified to make judgments in critical reading are those that have to do with the author's intention or purpose, with the accuracy, logic, reliability and authenticity of the writing and with the literary forms, constituent parts and plot resources identified through literary analysis.



This way of evaluating the reading material creates greater motivation for the student in the language. Therefore, it is considered relevant to include it in the new programming in order not to lose sight of the main objective pursued by the Chair of Technical English in Engineering, which is: to develop reading skills in the learner so that he can extract, in a critical way, specific information from texts related to his speciality and other related sources.

6. Methodological considerations

The methodology used to carry out the diagnostic study that reported the student's needs with respect to the teaching of Technical English at BS&H responds to the descriptive type under a documentary research design. The documentary and bibliographic review allowed the extraction of relevant and updated information on the contents that could be incorporated into the programmatic design to be carried out and subjected to scrutiny by the student as the main axis of the process. The descriptive phase involved analysing and discussing the results reported by the sample selected for this study.

6.1. Population and sample: The population of this research should be comprised of all the students from the seven BS&H Colleges: Civil, Geodesy, Industrial, Mechanics, Electrical, Chemistry and Petroleum, whose curriculum includes the Technical English unit. However, this study was limited to investigating the students' needs regarding the language from the Colleges of JNTUK-3, JNTUK-1, and JNTUK-2 in order to carry out an exhaustive and detailed analysis of the data reported on such needs. This analysis calculates the objectives and contents included in the new programming.

In this order of ideas and based on the approaches of Memon, et al (2020) [14], the sample was selected. According to these methodologists, "the recommended sample for descriptive research should represent 10 to 20 per cent of the accessible population". Considering that the three Colleges mentioned offer four sections of Technical English, with 25 students in each section, the total population would be 100 students per college. Thus, to investigate the students' needs concerning the language, 10 students were randomly selected from each of the Colleges (Industrial et al.). This type of sample is defined as simple random since all individuals had the opportunity to be chosen at random.

6.2. Measuring instrument: The questionnaire was the measuring instrument used to investigate the needs of students regarding the teaching of Technical English at the select colleges of JNTUK at the department of BS&H. Based on the latest research carried out by the department's staff in the foreign language teaching field, detailed in the preceding paragraphs. These items would determine the aspects that should be considered in the new programming were drafted.

This measuring instrument consisted of nine questions ranging from the student's knowledge of the professional profile contemplated in his/her career to aspects related to curricular transversality. The analysis and discussion of the results reported by the sample are presented below.

6.3. Procedure and Techniques for Data Analysis: Since ten students were randomly selected for each of the Colleges, the data analysis was carried out considering that the data represented 100% of the sample selected. The procedure followed for said analysis consisted of the accumulation of points (or frequencies) that the sample gave to each of the alternatives contained in the questionnaire items. This way of proceeding is immersed within one of the elements of the frequency distribution proposed by Chen, et al. (2015) [15]. According to these authors, "the report of the results of a cumulative frequency distribution can be presented with the most informative elements for the reader through comments".



In this sense, the analysis of the results is preceded by illustrative tables that allow not only the observation of the response alternative that obtained the highest number of accumulated frequencies but also to make the pertinent comments that must be considered for the programmatic redesign. It is worth noting that since the minimum number of alternatives offered in the questionnaire reached 3 (see item No. 1) and the rest of the questions were open-ended, the answers offered by the students were analysed based on the first three highest accumulated frequency scores.

6.3. Analysis and discussion of the results of the study for the redesign of the Technical English Programs based on student needs

The analysis and discussion of the results presented below are based on the nine (9) items that made up the questionnaire answered by the students who made up the sample from the JNTUK affiliated colleges 1-3. As mentioned earlier, tables were used to report the results of each of these items to indicate the accumulated frequencies and the way in which the college presents the student needs concerning the current program.

6.3.1. Knowledge of the professional profile of their career: This item was submitted for consideration to determine if the student knows what the College pursues regarding their academic and professional training. The fact that the student realises what is expected to be achieved through the curricular contents provided in each of the subjects that make up their career, including Technical English, will lead them to acquire academic commitments following the objectives contemplated in the curriculum of their professional career. Table 1 presented below reports the results obtained by the sample surveyed regarding knowledge of the professional profile of their career.

Table 1: Results on the knowledge of the professional profile (n=10 in each College)

JNTUK college-1			JNTUK college-2			JNTUK college-3		
Knows	More or less	Does not know	Knows	More or less	Does not know	Knows	More or less	Does not know
6	4		2	5	3		7	3

As shown in Table 1, only 60% of the students in the JNTUK college-1 are aware of the professional profile established in their curriculum. The JNTU Affiliated College 2 only had 20%, while in the JNTU Affiliated College -3 Engineering, none of the 10 respondents fully knew the professional profile required by their degree. These results demonstrate the almost total lack of knowledge on the part of the students of the goals that the College intends to achieve by the students.

Consequently, the programmatic redesign of the Technical English curricular unit must incorporate, among one of its objectives, teaching the student how learning this language contributes to the formation of the professional profile required by the College. This teaching objective should be of greater interest in the JNTU Affiliated College - 2 & 3, which reported a lower index in terms of knowledge of the main skills that the student must develop in order to assume a commitment to the social, economic and labour environment in which he or she will operate, in order to be a generator of changes and innovations.

6.3.2. Aspects to be considered in the program that contribute to improving the professional profile

This item of the questionnaire was drafted considering the common aspects established in the study plans of the surveyed Colleges concerning the professional profile they intend to achieve. The competencies that



involve extracting and interpreting information (abbreviated in the results table as extract), solving linguistic problems in texts in the area (abbreviated as solve), acquiring effective communication skills (abbreviated as acquire) and sharing engineering knowledge (abbreviated as share) represent the main actions that will contribute to achieving the formation of the professional profile of the JNTUK affiliated college-1, college-2 and college-3 engineer. Below are the results reported by the sample in the item described.

The results reported by the JNTUK college-1 in Table 2 coincide with those reported in Table 1. That is, the Chemistry student is aware that the skills that involve extracting and interpreting specific information in English from both printed and virtual texts; solving jointly linguistic problems in the English language and the engineering area presented in texts in English; acquiring practical communication skills among peers to share knowledge of the area in English; and sharing engineering knowledge to solve environmental problems through cooperation and interdisciplinarity, will contribute to developing their training and development as a comprehensive engineer.

Regarding the Colleges of JNTUK 2&3, even though the majority of students showed an almost total lack of knowledge of the professional profile established in the curriculum of their colleges, as illustrated in Table 1, these students do have a very clear idea of the type of linguistic skills they need to develop in the English language to function in the professional field.

Table 2: Results about the aspects that contribute to achieving the professional profile

JNTU K College-1				JNTU K College-2				JNTU K College-3			
extract	solve	acquire	Share	extract	solve	acquire	Share	extract	solve	acquire	Share
9	10	8	9	10	2	9	7	10	9	10	9

Including these competencies in the programmatic redesign of the Technical English curricular unit is mandatory since it will contribute to forming the professional profile required by the institution and the society where this engineering professional will perform in the future. In addition, the design of a competency-based program, as proposed by Rosales (2004) and Canquiz (2005), will create the ideal conditions to develop in the student: being a professional capable of extracting and interpreting specific information in a foreign language, knowing how to solve problems in the language that he is in the process of learning to make communication between his peers from other latitudes flow effectively and efficiently and in this way being able to coexist in a harmonious and updated manner in the global village of knowledge that surrounds him as an environment.

6.3.3. Language skills that need to be incorporated into the new program design

This item sought to investigate which language skills, in addition to reading, need to be incorporated into the new program design. To this end, productive and receptive skills were included, including understanding what is heard (abbreviated in the results table as understanding), speaking, and writing. The results of this item are presented in Table 3.

Table 3: Results on the language skills to be incorporated into the Program

JNTU K College-1				JNTU K College-2				JNTU K College-3			
Read	Understand	Speak	Write	Read	Understand	Speak	Write	Read	Understand	Speak	Write
6	9	3	1	9	9	7	7	6	9	8	6



As seen in Table 3, the most relevant results reached a cumulative frequency of 9 points in the alternative that involves understanding what is heard. This receptive language skill leads one to think that students are more interested in understanding the spoken language than in developing writing or oral skills in English. Therefore, the new program design must include objectives to exercise this language skill. This inclusion merits the teacher exercising the language specific to the learner's speciality in the classroom orally.

Concerning the other language skills, reading, writing and speaking, it is observed that the results reported by both the JNTU Affiliated colleges -1 and the JNTU Affiliated colleges -2, give second place in importance to the reading skill, which is established in the current Program. Consequently, it must be analysed how both receptive skills can be combined in the new program design to meet the reported needs.

It is worth highlighting the importance of oral skills by the JNTU Affiliated colleges -3, which accumulated 8 points. This implies creating or selecting strategies to exercise the language of the speciality so that Petroleum students produce it.

6.3.4. Linguistic aspects that must be incorporated into the new program design

The introduction of this item in the data collection instrument sought to measure whether the strategies included in the current Program needed to be reinforced with exercises that placed greater emphasis on grammar, reading, and vocabulary or if they needed to develop other receptive-productive language skills, such as oral or written expression. Table 4 below reports the results obtained in this item.

Table No. 4: Results on the linguistic aspects that should be incorporated into the new program design

JNTU K College-1	Gram.	6
	Reading	5
	Voc.	5
	+Reading	5
	Oral	6
	Esc.	3
JNTU K College-2	Gram.	3
	Reading	5
	Voc.	6
	+Reading	6
	Oral	6
	Esc.	7
JNTU K College-3	Gram.	2
	Reading	4
	Voc.	5
	+Reading	7
	Oral	6
	Esc.	3

In general terms and assuming that the first four boxes refer to the linguistic aspects that should be reinforced in the development of reading skills, the degree of importance that students give to this skill can be observed in the results highlighted (in bold) in Table 4. This is established in the current programs, which leads to considering the importance given by the sample to the objectives and content of said programs. However,



the results also point to the development of oral comprehension, which implies understanding what is heard in English. These last results agree with the previous results, illustrated in Table 3. Therefore, the importance of incorporating oral comprehension skills in redesigning the programs is reiterated.

On the other hand, the results obtained by the JNTU Affiliated college -2 deserve special attention, with a score of 7, assigned to the written skill in English. This selection may be due to the position of English teaching as an elective within the curriculum of this College, which is located in the last semester of the degree (9th semester). Most of these students have a slightly higher level of prior knowledge of the English language than the rest of the respondents, who take Technical English between the 2nd and 7th Semesters.

Regarding the JNTU Affiliated Colleges -2, the programmatic design of Technical English must include objectives to practice writing in this language, using the language of mechanical engineering. This implies selecting teaching material according to relevant subjects to articulate the objectives and content of Technical English.

6.3.5. Reading skills to be incorporated for the efficient analysis of a text in English: In this section of the questionnaire, we sought to investigate the aspects related to the difficulties in reading comprehension presented by the scientific-technical discourse used by the sample in the current programs. Thus, the first and third alternatives intended to evaluate the intention or purpose of the writer and the literary analysis, respectively, are related to critical reading; the second alternative, to translation, and the fourth, to the understanding of the cohesive elements of the scientific-technical discourse. Table 5 shows the results obtained in this section of the questionnaire.

Table No. 5: Results on reading skills to be incorporated for the efficient analysis of a text in English

JNTU K College-1				JNTU K College-2				JNTU K College-3			
identi fied	esta blish	deter mine	underst anding	identi fied	esta blish	deter mine	underst anding	identi fied	esta blish	deter mine	underst anding
3	5	2	6	4	3	4	8	5	5	2	5

The results that stand out the most in Table 5 agree on assigning greater relevance to incorporating reading skills that contribute to the understanding of the language mechanisms responsible for establishing cohesiveness within the text written in English. Therefore, for the redesign of the Technical English program of the surveyed Colleges, it is necessary to incorporate these skills in light of the approaches suggested by Lugo (2002) that have to do with the influence of cohesion on the processing of information in written texts, to achieve better reading comprehension. This will contribute to the student carrying out an efficient analysis of texts of the speciality in English. Another skill that reached second place in importance, given by the respondents from the Colleges of JNTUK and that achieved a score of 5, was that which refers to establishing the logical and reliable accuracy of what is written in English, that is, the skill that implies teaching translation techniques. Regarding this particular, it is necessary to implement the reading comprehension strategies suggested by Batista (2005) and Márquez (2006) on this linguistic aspect to contribute to a better reading comprehension of scientific-technical texts written in this language.

The data reported by the JNTU Affiliated colleges -3 Engineering, regarding critical reading, which also reached an accumulated frequency of 5 points in this College, like the previous one, deserve special analysis. According to Pires (2004), this type of skill requires that the student evaluates the material to be read critically,



creating greater motivation in the language. Therefore, the possibility of including critical reading objectives in the programmatic redesign of this particular College will be studied.

6.3.6. Technological innovations to be incorporated in the computer room: The alternatives provided in this item of the questionnaire sought to determine not only the student's conformity concerning the use of the Microsoft Encarta Encyclopedia, currently used as a teaching aid for practising reading skills in English, but also sought to investigate the need to incorporate another type of technological innovation feasible to use in the computer room. The results of this item are illustrated in Table 6.

Table No. 6: Results of technological innovations to be incorporated in the computer room

JNTU K College-1					JNTU K College-2					JNTU K College-3				
Internet	digital.web	Encycl.Digital	same	Others	Internet	digital.web	Encycl.Digital	same	Others	Internet	digital.web	Encycl.Digital	same	Others
8	1	4	1		6	5	6			8	3	5	1	

The results illustrated in Table 6 demonstrate the importance of using the Internet, as reported by all Colleges, in the practical classes developed in the computer room. This educational alternative had the highest score in the three surveyed Colleges, followed by using a digital Encyclopedia, which had scores ranging from 4, 6 and 5. These results lead to a decision regarding the programmatic design of the classes that are taught in the computer room, which should incorporate the suggestions made by Finol (2000) regarding the advantages offered by the Internet by providing texts in electronic books and magazines, Web pages, e-mails and digital newspapers.

It is worth highlighting the little importance given to using the Microsoft Encarta Encyclopedia by two surveyed Colleges, and one did not even provide information on the subject. This implies changing the methodology currently applied in these three colleges for the sustained practice of reading comprehension in the computer room, and for another, including using a digital encyclopedia through the Internet. In this order of ideas, the approaches outlined by Finol (2000) will be followed, which include a set of alternatives based on Web technology that is feasible to assume within the teaching objectives that will be redesigned. In this way, a Technical English program will be designed based on the student needs of the 21st century.

6.3.7. On curricular transversality: For this aspect of the design of the English Program based on student needs, items 7, 8 and 9 were arranged. Item 7 sought to investigate which subjects in the curriculum of each of the surveyed Colleges could be linked to the objectives and content of the Technical English Program. Item 8 sought to determine the type of document suggested for extracting relevant texts related to the program.

For its part, item 9 was arranged to gather information about the subjects in the curriculum of each surveyed college that could be considered for extracting texts to be processed in Technical English classes. Since these three items refer to curricular transversality, their results are presented below in Tables 7, 8 and 9.

Table No. 7: Subjects to be linked to the objectives and content of English

JNTU K College-1	Total	JNTU K College-2	Total	JNTU K College-3	Total
Chemistry	8	Computer Engg	8	Physics	8
Physics	5	machine elements	6	mathematics	6
unit operations	2	chemistry	5	mechanics	4



Table No. 8: Suggested documents for extracting relevant texts related to the degree

JNTU K College-1					JNTU K College-2					JNTU K College-3				
books	Art	internet	Encycl.	others	books	Art	internet	Encycl.	others	books	Art	internet	Encycl.	others
2	6	7	2		5	6	8	2	2	4	8	5	2	

Table No. 9: Subjects to extract readings in English

JNTU K College-1	Total	JNTU K College-2	Total	JNTU K College-3	Total
Chemistry	5	Computer Engg.	6	Physics	7
Physics	3	machine elements	5	mathematics	8
unit operations	3	mechanics	4	mechanics	8

As seen in Tables 7, 8 and 9, the diverse nature of the information reported merits a separate analysis of each surveyed College. In this sense, it is essential to mention that without wishing to detract from the merits of the other items in the questionnaire, it represents a relevant source for the teacher designing the program because the information collected will serve as a starting point and an unlimited resource for the selection of teaching materials by student needs. With this resource and as León (2005) suggests, both the cognitive and affective areas of the learner will be interrelated by allowing him to exercise reading skills in English with texts that will be relevant, important and pertinent for him.

Regarding the JNTUK Affiliated colleges -1, the data that stand out the most (See Table 7) suggest articulating the objectives and contents of the subjects Thermodynamics II (whose score was 8) and Unit Operations (whose score rose to 5) with the objectives and contents of English. It is worth mentioning that these data coincide with the results illustrated in Table 9, for the subject Thermodynamics II, which is suggested by the sample of students surveyed to extract relevant texts of the speciality to be processed in the Technical English classes, in addition to the subject Transport Phenomena which is related and has priority established in the study plan of this degree with Unit Operations. The documents proposed by this sample, from which readings of these subjects can be extracted, were represented by the Internet (with a score of 7) and by scientific articles in the area. This last suggestion agrees, in part, with what was reported by this same sample in item 6.

As for the JNTU Affiliated college -3, the subjects that were most relevant to carry out the articulation with the objectives and contents of English were Power Generation (with a score of 8), Machine Elements, which takes precedence in the curriculum of the degree with the subject Fluid Mechanics (with a score of 6) and Thermodynamics (with a score of 5). As with the JNTU Affiliated Colleges -1, these results coincide with the subjects suggested by the students for extracting reading material specific to the speciality. The degree of importance assigned to these same subjects (See Table 9) makes clear the direction to be followed by the designer concerning the source of the search for teaching material. Likewise, the documents suggested by the students to extract this type of material pointed to the exploration of both the Internet (with a score of 8) and scientific articles (with a score of 6) in the area of Mechanics (See Table 8).

Finally, regarding the data reported by the JNTU Affiliated Colleges -3 Engineering regarding curricular transversality, it was found that drilling, sound profiles, and geology represented the subjects most relevant for

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articulation with English. As reflected in Table 7, these three subjects achieved a score that ranged between 8, 6 and 4 points, respectively. In order to extract readings from the speciality, the students suggested the subjects of environmental engineering. In this sense, it is worth highlighting the priority existing between the subjects of Physics and Mathematics. As shown in Table 9, they coincide in terms of the level of relevance given by the sample surveyed, both for articulation and for the extraction of teaching material. Consequently, the subjects of drilling and geology must be considered as essential sources for the design of activities that involve the development of the skills proposed by the students of this College in the preceding items. Regarding the suggested documentary sources for the extraction of the material to be processed in the Technical English classes, the results reported in Table 8 lean towards the use of articles from the speciality (with a score of 8), the Internet (with a score of 5) and books (with a score of 4). Of these three documentary sources, the one that achieved the highest score was the use of articles from the speciality, which considers this type of specialised bibliography for selecting reading materials to be processed in the Technical English classes of the selected engineering colleges.

Conclusions and Recommendations

The conclusions and recommendations below represent the result of the theoretical and methodological analysis to diagnose student needs regarding redesigning the current English Programs in the Colleges of JNTUK 1-3. Through this diagnostic research, we sought to determine the effectiveness and efficiency of the Technical English programs currently taught in these Colleges and investigate other curricular aspects that could be incorporated into said programmatic redesign. From this study, we conclude and recommend:

- The unavoidable condition of keeping the curricula and educational processes of the university Academic Programs updated and appropriate by the scientific and technological advances of the professions and adapted to regional, national and international needs. This can only be achieved through the joint work of teachers from each area and students' willingness to express their needs and interests concerning these areas. In this particular case, the joint work carried out by teachers from the English area and students served as a preamble to the determination of the objectives and content, the type of language skill to be developed, the activities to be carried out and all those aspects that will serve as invaluable input for the redesign of the Technical English program of these Colleges.
- The diverse nature of the results reported by the Colleges of JNTUK-1, JNTUK-2 and JNTUK-3 lead to the conclusion that the redesign of the Technical English Programs for these Colleges must be based on the specific needs of the students concerning the language, taking into account the diversity of the results of each of the specialities of the learner. Therefore, it is recommended that these results redesign the current programs.
- The surveyed Colleges, except the JNTU-affiliated College -1, require the incorporation of teaching objectives in which the professional profile that this institution has established in the curriculum is made known. In this way, the student will feel committed to the goals and acquire the responsibilities inherent to his academic and professional training.
- The students surveyed emphasise the importance of reading in English as a means that will allow them to be up to date with the latest developments in their area since these are disseminated in most cases in this language. These results suggest that this receptive skill should be included in the new programming, considering the strategies reported in Table 4, to reinforce it. In addition, it is recommended that this reading skill be combined with the inclusion of the receptive skill and understanding in the new programmatic design of the JNTUK affiliated college-1 and JNTUK affiliated



college-2, which occupied second place in importance. As for the JNTU Affiliated colleges -3, it is advisable to use this same combination, but consider the development of writing skills.

- The linguistic aspects related to critical reading, translation techniques and the understanding of cohesive elements should be included in the new programming so that the student achieves effective and efficient reading comprehension.
- Given the low relevance given by the surveyed Colleges to the exercise of reading skills through the Microsoft Encarta Encyclopedia in the computer room, excluding it from the new programmatic redesigns is recommended since the entire sample does not consider such exercise relevant.
- Concerning curricular transversality, each of the surveyed Colleges reported the subjects whose objectives and content are feasible to be articulated with the objectives and content of English. Therefore, it is recommended to take each of the reported subjects as a source of exploration and search for the design of teaching materials for this curricular unit in the new programmatic designs based on student needs.

References

- [1]. Mohiuddin, Muhammad & Hosseini, Elahe & Bagheri Faradonbeh, Sedigheh & Sabokro, Mehdi. (2022). Achieving Human Resource Management Sustainability in Universities. *International Journal of Environmental Research and Public Health*. 19. 10.3390/ijerph19020928.
- [2]. Small, Lynlea & Shacklock, Kate & Marchant, Teresa. (2017). Employability: a contemporary review for higher education stakeholders. *Journal of Vocational Education and Training*. 70. 1-19. 10.1080/13636820.2017.1394355.
- [3]. Ertugrul Secer, Sule & Erisen, Y.. (2020). Evaluation of English language teaching undergraduate programs in terms of document analysis Available online at ijci.wcci-international.org *International Journal of Curriculum and Instruction* 12(2). 671-703
- [4]. Isnin, Siti. (2018). Exploring the Needs of Technical Writing Competency in English among Polytechnic Engineering Students. *International Journal of Academic Research in Business and Social Sciences*. 7. 10.6007/IJARBS/v7-i12/3594.
- [5]. Shettar, I. M., Hadagali, G. S., Bulla, S. D., & Kadakol, M. C. (2021). Authorship Trends and Collaboration Pattern in Jawaharlal Nehru Technological Universities: A Scientometric Study. In B. Ramesh Babu, et al. (Eds.), *Marching Libraries from Traditional to Hybrid: Connecting, Communicating and Cooperating* (pp. 464–480). Shree Publishers & Distributors, New Delhi.
- [6]. Gašior, Marcin & Skowron, Lukasz & Sak-Skowron, Monika. (2021). The Importance of Employees' Competencies: A Comparison between Educational and Business Perspective. *European Research Studies Journal*. XXIV. 681-694. 10.35808/ersj/2303.
- [7]. Lang, Michael. (2006). Hypermedia and Associated Concepts. 10.4018/9781591407997.ch091.
- [8]. Tezci, Erdoğan & Demirli, Cihad & Sapar, Vahit. (2007). ENGLISH LANGUAGE TEACHING WITH AN ELECTRONIC CONCEPT MAPPING. *International Journal of Emerging Technologies in Learning*. 2(2). 1-6
- [9]. Suputra, Dwi. (2021). Teaching English Through Online Learning (A Literature Review). *The Art of Teaching English as a Foreign Language*. 2. 63-67. 10.36663/tatefl.v2i1.104.

International Journal of ELT, Linguistics and Comparative Literature*(Old Title-Journal of ELT & Poetry)*<http://journalofelt.kypublications.com>**Vol.12.Issue.4. 2024(July-Aug)****ISSN:2455-0302**

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- [10]. Rietveld, Laurent. (2019). Use of vocabulary translation strategies: A semantic translation analysis. *Applied Translation*. 13. 10.51708/apprans.v13n2.419.
- [11]. Laxén, Jannika & Lavaur, Jean-Marc. (2010). The Role of Semantics in Translation Recognition: Effects of number of translations, dominance of translations, and semantic relatedness of multiple translations. *Bilingualism: Language and Cognition*. 13. 157 - 183. 10.1017/S1366728909990472.
- [12]. Subramanian, Vivek & Sundararaman, Dhanasekar. (2021). How do lexical semantics affect translation? An empirical study. 10.48550/arXiv.2201.00075.
- [13]. SUZANNE, NINA. (2016). BEING ACTIVE READERS BY APPLYING CRITICAL READING TECHNIQUE. *Ta'dib*. 14. 10.31958/jt.v14i1.197.
- [14]. Memon, Mumtaz & Ting, Hiram & Cheah, Jun-Hwa & Ramayah, T. & Chuah, Francis & Cham, Tat-Huei. (2020). Sample Size for Survey Research: Review and Recommendations. 4. i-xx. 10.47263/JASEM.4(2)01.
- [15]. Chen, Pai-Lin & Cheng, Yuchung & Chen, Kung. (2018). Analysis of Social Media Data: An Introduction to the Characteristics and Chronological Process. 10.1007/978-3-319-95465-3_16.