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Technology and Language: Improving Speaking Skills through Cybergogy-Based Learning

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Abstract—**Language learning in the Industrial Revolution 4.0 and Society 5.0 era is required to produce students with 21st-century skills by increasing the capacity and capability of using technology in learning. Technology-based learning, known as cybergogy, is a continuity of learning paradigms that previously applied the principles of pedagogy and andragogy in the learning process. As a new concept in learning, cybergogy is essential in improving 21st-century skills in the form of the 6Cs (Citizenship, Character, Critical Thinking and Problem Solving, Communication, Creativity, and Collaboration). Enhancing communication skills through cybergogy-based learning is a novelty that has not been done much and has become the focal point of research. This research, part of development research using the ADDIE model, employed a quasi-experimental design conducted in 3 senior high schools in Yogyakarta, representing one school per category, namely the lower, medium, and high categories, based on UTBK scores. A non-equivalent control group design involving an experimental and control class was applied. The results of this study, which showed a significant improvement in students' communication skills, especially speaking aspects, through blended learning, are of great significance. Therefore, it can be concluded that cybergogy-based language learning has proven effective in improving students' communication skills through blended learning.**

Keywords—**Cybergogy; learning; speaking; technology.**

I. INTRODUCTION

Technology-based learning is a significant development of learning techniques, especially since the outbreak of the COVID-19 pandemic through the application of online learning using various technological devices such as computers, laptops, devices, and so on. This learning is applied as online learning, so student involvement and participation become teachers' primary focus and concern [1]. Online learning policies that are implemented suddenly indirectly have a positive and negative impact on teachers and students [2]–[4], especially at the primary, intermediate, and upper levels. Positive implications for teachers include teaching flexibility [5]–[7], digital skills development [8], [9], increased access to learning materials and resources [10], [11], and peer collaboration [12], [13]. Meanwhile, the positive impacts of online learning for students include flexibility of time and place [14], [15], access to additional material [16], [17], and self-study [18], [19].

In addition to the positive impact, online learning has a negative impact on teachers, including demands for more workload [20], [21], limitations of technology, and internet access [22], [23]. Furthermore, negative impacts for students include limited access to technology for some students [24] [25], reduced social interaction [26] [27], and limitations of focus and motivation [28] [29]. By considering this, this study tries to develop a cybergogy-based learning model.

Cybergogy was born as a continuity of previous learning concepts, namely pedagogy and andragogy. Cybergogy arises due to the widespread use of technology in learning, especially online learning [30]. In other words, cybergogy seeks to harmonize teaching methods with online learning environments [31]. The term cybergogy comes from the words "cyber" which refers to digital and the internet, and "pedagogy" which refers to science or one of the teaching methods. Thus, cybergogy focuses on the effectiveness of online learning, which aims to create interactive, engaging, and efficient experiences through various online platforms by utilizing technology, information, and communication.

Although the central concept of cybergogy is applied to online learning, this research is implemented through blended learning. This is adjusted to the development of situations and

conditions and technical learning policies in Indonesia, which have returned to regular face-to-face in-class (offline). The cybergogy application scenario in blended learning is a novelty in this study, which is expected to improve the quality and quantity of education to produce students who have 21st-century skills consisting of Citizenship, Character, Critical Thinking, Communication, Creativity, and Collaboration (6C) [32]–[34]. In addition, cybergogy as an object of research is still not much glimpsed by researchers compared to topics in other fields of education. This is evidenced by the limited references in a literature review, as shown in the Connected Paper application.
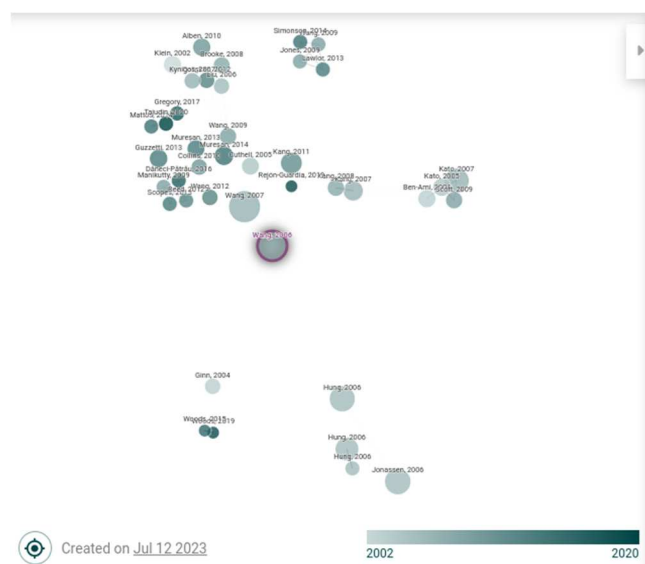

Fig 1 Display of Connected Paper related to Cybergogy Topics

In addition, literature reviews adapted through Harzing Publish and Perish found that the connectivity of writings both books and articles about cybergogy in Indonesia is still very limited. There are at least 2 clusters with 3 items, namely cluster 1 [35] and cluster 2 [36] as shown below.
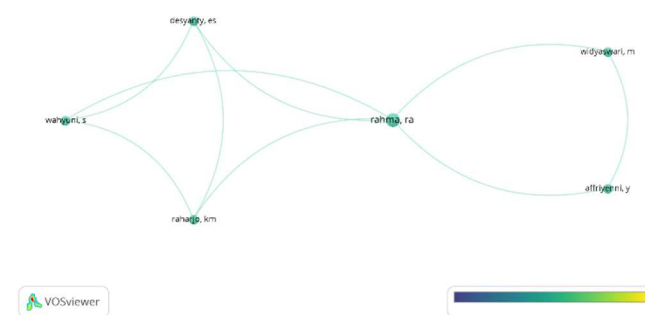

Fig 2 Cybergogy Writer Connectivity Display via Vosviewer

Next, the distribution of topics related to cybergogy through the Vosviewer display is at least divided into 5 clusters, namely cluster 1 with 7 items (effect, heutagogy, impact, peeragogy, present study, structural equation model approach), cluster 2 with 7 items (accountability, cybergogy model, financial literacy cybergogy, human value, practice, promoting financial literacy, secondary school student),

cluster 3 with 5 items (abstract, Cybergogy Paradigm, Higher Education, Paper, Paradigm), cluster 4 with 4 items (Cybergogical Strategy, Essence, Motivation, Virtual Learning), cluster 5 with 3 items (Archetype, Aspect, Framework). Thus, it can be seen that the study of cybergogy models is still limited compared to other studies such as heutagogy, virtual learning, paradigms, and others as the following visualization in the subsequent period from 2014 - 2022.
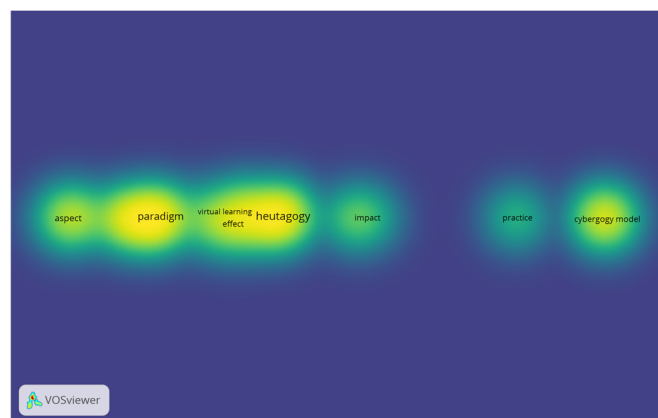

Fig 3 Spread Cybergogy Topics through Vosviewer Display

The concept of cybergogy learning consists of three main domains, namely cognitive, emotional, and social domains [37]. The cognitive domain is related to the ability to cognition, think, and understand [38]. Furthermore, the emotional domain deals with aspects of motivation, feelings, and emotional well-being of learners [39]. Meanwhile, the social domain is related to interaction, relationships, and collaboration between fellow students and teachers [40]. Therefore, optimizing these three domains through blended learning is expected to improve the quality and capability of language learning, especially in speaking and presenting skills.

Speaking and presenting skills are one of the focuses of this research because preliminary research shows that students' speaking skills are low, especially during online learning. This is in line with several studies that show that students' speaking skills in online learning are low due to several factors such as: lack of learning motivation [41], limited speaking practices [42], lack of social interaction [43], anxiety factors and lack of self-confidence [44], and less supportive learning environments [45]. Therefore, learning scenarios through blended learning packaged in cybergogy-based learning models through cognitive, social, and emotional domains are expected to improve students' speaking skills both in online and offline learning.

II. MATERIALS AND METHOD

This research is development research using the ADDIE development model. This model consists of five stages: analysis, design, development, implementation, and evaluation (evaluation of learning models) [46]. This study used a quasi-experimental design conducted in 3 senior high schools in the city of Yogyakarta, representing one school per category, namely the lower category, medium category, and high category, based on UTBK scores. A non-equivalent

control group design involving an experimental and control class was applied. Thus, this study's population and sample are Indonesian students and teachers at SMA A, SMA B, and SMA C in the city of Yogyakarta for the 2022/2023 school year consisting of teachers and grade X students. In addition, the results of interviews and questionnaires are further interpreted and presented qualitatively.

TABLE I
THE NUMBER OF RESEARCH SAMPLES

Subject	Experimental Class	Control Class	Total
SMA A	34	33	67
SMA B	33	32	65
SMA C	35	35	70

III. RESULTS AND DISCUSSION

A. Results

Development of cybergogy models to improve speaking skills: the development of a cybergogy model to improve the language skills of high school students, especially speaking and presenting skills, is based on the conditions and needs of teachers and students according to the results of the initial survey at this stage of research. Based on the results of interviews and questionnaires filled out by teachers and students, it was concluded that several factors cause low student speaking skills, especially during online learning. The analysis showed that these factors include limited access to technology, a less supportive learning environment, limited social interaction, lack of support and guidance, lack of confidence, lack of technology skills, passive learning, and high student workload. This can be seen in the following figure. Based on Fig. 4, it can be seen that the factors causing students' low speaking skills are (1) self-confidence (27%), (2) passive learning (20%), (3) lack of social interaction (12%), (4) large task load (12%), (5) learning environment (10%), (6) limited access to technology (9%), (7) technology skills (5%), and (6) lack of support and guidance (5%). Therefore, several factors that are the leading causes of students' low speaking and presentation skills are the focus of this study, namely lack of self-confidence and passive learning. Thus, the development of learning models is based on these two factors.
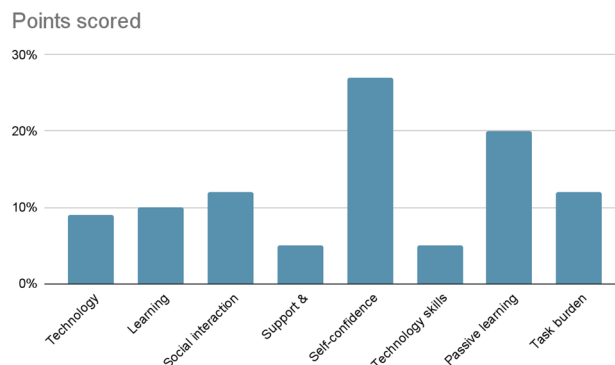

Fig 4 Factors causing low speaking skills in online learning

1) Blended learning to increase students' confidence: Self-confidence is very closely related to students' speaking skills [47]–[49]. Students with good speaking skills tend to feel confident communicating with their social environment. Conversely, underdeveloped speaking skills can cause decreased self-confidence when speaking in social circles or official forums. Therefore, a teacher should be able to develop students' speaking skills in the learning process both in class and online. The techniques to improve students' speaking skills through a cybergogy-based learning model are as follows.

TABLE II
TECHNIQUES FOR IMPROVING STUDENTS' SPEAKING SKILLS THROUGH A CYBERGOGY-BASED LEARNING MODEL

No	Elements	Learning Model	Target Achievement	Domain	Learning Strategy
1	Self-expression	Offline learning	Students can express emotions freely.	Emotional domain	Students are given space and time to communicate emotional states before starting learning.
			Students can communicate knowledge and experience freely.	Cognitive domain	Students are allowed to describe their knowledge and experience through lighter questions given by the teacher.
			Students can discuss material in study groups freely.	Social domain	Students are given space to convey ideas, thoughts, and ideas in study groups.
		Online learning	Students can express themselves through project assignments that are accessed online.	Cognitive, social, and emotional domains	Students are given space to produce products with the characteristics of speaking in online study groups.
2	Social interaction	Offline learning	Students can express sympathy and empathy freely.	Emotional domain	Students can communicate sympathy and empathy among friends, teachers, and social circles.
			Students can tell experiences and knowledge freely.	Cognitive domain	Students are allowed to share experiences and knowledge in the learning process.
			Students can communicate thoughts in groups freely.	Social domain	Students can contribute thoughts in open study groups.
		Online learning	Students can interact and communicate online.	Cognitive, social, and emotional domains	Students are given a space for chat and online discussion through the Learning Management System.
3	Public speaking.	Offline learning	Students are able to communicate emotional conditions to general audiences.	Emotional domain	Students are given the opportunity to communicate their feelings in public freely.
			Students can convey thoughts and ideas in public.	Cognitive domain	Students convey thoughts and ideas in the learning process in or outside the classroom.
			Students can communicate well in public.	Social domain	Students communicate well and effectively in public.

No	Elements	Learning Model	Target Achievement	Domain	Learning Strategy
		Online learning	Students can communicate thoughts and ideas in online learning.	Cognitive, emotional, and social domains	Students communicate ideas, thoughts, and ideas in public through online learning.
4	Confident	Offline learning	Students can express feelings with confidence.	Emotional domain	Students are skilled at expressing feelings and emotions with confidence.
			Students can communicate ideas, thoughts, and ideas with confidence.	Cognitive domain	Students are allowed to communicate ideas, ideas, and thoughts confidently.
			Students can communicate in social environments with confidence.	Social domain	Students are allowed to communicate well in social settings with confidence.
		Online learning	Students can express ideas, thoughts, and feelings confidently in online learning.	Cognitive, social, and emotional domains.	Students are given the opportunity and freedom to confidently communicate ideas, thoughts, and feelings in online learning.

2) The effectiveness of cybergogy model to improve speaking skills: By the situation and conditions in the field, the learning applied in schools has returned to normal (face-to-face learning). Therefore, the cybergogy learning model is designed for two types of learning, namely online and offline learning (blended learning), to maximize the quality and quantity of learning to improve students' skills in speaking and presenting. The development of cybergogy-based learning models in blended learning is carried out through the preparation of learning tools in the form of:

TABLE III
CYBERGOGY-BASED LEARNING TOOLS

No	Learning Tools	Specifications	Cybergogy Element
1	Learning modules	Learning outcomes; Elements of learning outcomes; Learning objectives; Learning objectives flow; Pancasila profile dimensions; Pancasila student profile; Meaningful understanding; Target students; Facilities and infrastructure; Learning model; Lighter questions; Learning preparation; Learning materials; Learning resources; Learning activities; Types of assessments; Glossary	Product specifications are developed based on regulations and technical guidelines in the Merdeka Belajar curriculum. Furthermore, several elements are included in the cybergogy; earning domain, which consists of the cognitive, social, and emotional domains.
2	Teaching materials	Presentation slides; Reading materials; Case study; Role-playing games; Learning videos; Podcast projects	Teaching materials are developed based on students' needs and learning characteristics. Teachers can utilize these teaching materials according to student learning characteristics, such as visual, auditory, reading/writing, and kinesthetic, by sticking to cognitive, emotional, and social domains. Students can access all teaching materials online through the link or barcode provided.
3	Learning Implementation Plan	Learning identity; Learning materials; Learning resources; Learning scenarios; Learning assessment	The preparation of Learning Implementation Plans (RPP) is developed based on rules integrated with the three domains of cybergogy at each stage of learning.
4	Learning assessment	Diagnostic assessment (Student learning styles, Pretest); Formative assessment (Low, Medium, High); Summative assessment (Offline, Online); Enrichment; Reflection; Observation; Quiz	Learning assessment is prepared based on characteristics and learning models based on cognitive, emotional, and social domains. This assessment option is also adjusted to both online and offline learning methods, which students can access online through links or barcode scans that have been provided.
5	Teacher's journal	Identity of the teacher; Subject identity; Learning notes; Emotional sheet; Daily plan; Weekly plan; Monthly plan	The preparation of this teacher's journal is based on needs and complements the cybergogy domain, especially in the emotional domain.
6	Student journal	Student identity; Subject identity; Learning notes; Emotional sheet; Reading lesson plan; Daily plan; Annual plan	The preparation of student journals is also based on needs and simultaneously complements the emotional domain in the cybergogy-based learning model.

After meeting the requirements of the assumption test, an inferential statistical analysis is carried out in the form of a normality test and a homogeneity test. The normality test was conducted on data on communication skills, as shown in the following table. Table 4 shows that the sig value of communication skills of the experimental class on the pre-test and post-test is higher than 0.05. This assumes that the data in the experimental class is usually distributed. Likewise, the data in the control class shows a value greater than 0.05, which means that the data is also normally distributed.

TABLE IV
NORMALITY DATA OF COMMUNICATION SKILLS

Test	Class	Statistic	Df	Sig.
Pre-test	Experimental class	0.985	47	0.710
	Control class	0.970	45	0.339
Post-test	Experimental class	0.968	47	0.178
	Control class	0.955	45	0.072

Furthermore, the homogeneity test data of communication skills can be seen in the following table.

TABLE V
HOMOGENEITY OF DATA ABOUT COMMUNICATION SKILLS

Test	Based	Levene statistic	df1	df2	Sig.
Pre-test	Based on mean	1.890	1	90	0.174
Post-test	Based on mean	0.019	1	90	0.896

Table 5 shows the values of sig. The pre-test is 0.174, and the post-test is 0.896, which indicates that both values are higher than 0.05 so that it can be interpreted that the data has been homogeneous. Furthermore, to measure the effectiveness of the cybergogy model and to improve students' communication (speaking) skills, a paired sample t-test was carried out while identifying differences between the experimental class and the control class. The results of the descriptive analysis showed an improvement in students' speaking skills after applying cybergogy learning with the concept of blended learning. This is demonstrated by the average value before and after using the cybergogy model, as shown in the following table.

TABLE VI
COMMUNICATION SKILLS OF THE EXPERIMENTAL GROUP

Pair	Test	Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-test	56.95	47	6.032	0.875
	Post-test	68.54	47	5.053	0.732

Based on the table above, the average score on the post-test reached 68.54, which is higher than the pre-test, which only reached 56.95. This proves that students' communication skills, especially speaking and presentation skills, increased in the experimental group through the cybergogy learning model.

B. Discussion

Applying the cybergogy learning model to grade X senior high school students indicates a positive attitude towards improving speaking and presenting skills in experimental classes. The cybergogy-based learning model applied through blended learning scenarios can answer the problems encountered, significantly increasing student confidence through active learning designed online and offline. Synchronous learning allows students to explore knowledge more deeply, making learning activities more conducive and directed. Furthermore, asynchronous learning provides a second space for students to explore and share learning resources and expertise outside the classroom, equipping students with various resources to discuss again in face-to-face class learning. This significantly impacts students' confidence in speaking and presenting material in class. Thus, learning becomes more active, especially in discussion activities.

Integrating online and offline learning provides a richer and more diverse learning experience. In simple terms, this model is applied with steps:

1) *Introduction of material through online learning using an LMS platform that contains initial content* such as videos, reading materials, or presentation materials for the topic to be studied. In this context, students are given pre-class assignment messages that explore students' understanding or experience through lighter questions.

2) *Discussion and brainstorming in offline classes* can encourage students to speak and present their respective materials or experiences according to the topics discussed. The teacher facilitates the discussion with open-ended questions that invite active participation from each student.

3) *Students can participate in simulated presentations in front of the class* through offline presentation simulation. Provide constructive feedback on speaking style, posture, eye contact, and visual use. We recommend that teachers also award students who perform well in this simulation.

4) *Development* of online presentation materials after students discuss in offline classes with assignments, such as developing individual or group presentations using online learning platforms in the form of slides, designing presentation structures, and formulating the messages conveyed.

5) *Project-based online learning* to make presentations on selected topics involving research, analysis, and presentation of information. In this case, teachers should provide support through video tutorials or online guides.

6) *Evaluation and feedback* sessions after students present project results, where they get input from teachers and peers to improve the project they have prepared.

7) *Reflection and self-development* are necessary to encourage students to reflect on their learning experiences.

8) *Interactive technology*, such as video conferencing or presentation applications, can more interactively connect online and offline learning.

The use of technology in learning can help students be more creative and efficient in an interactive learning environment. Students can explore knowledge from various types of learning resources by staying active under teacher supervision through online learning platforms anywhere and anytime collaboratively (online discussions) or independently [50], [51]. In online learning, a teacher is a facilitator by providing eBooks, voice notes, and video tutorials as complementary materials for learning at home or independent study.

The cybergogy-based blended learning model not only positively affects students' speaking skills but also forms active learning because all students are involved in every activity individually and in groups. This can foster self-confidence and self-motivation to convey their ideas in public and respect other class members' opinions. Next, online communication makes it easier for students to share knowledge, experience, and learning resources both in the context of formal classes and the wider learning community [52].

Student-centered learning can accommodate learning according to each learning style and characteristic. The concept of cybergogy-based blended learning more effectively supports independent learning through learning activities outside the classroom. The flexibility of the information collected stimulates students to identify, analyze, and evaluate the information needed and use it for skill development both in the classroom and in the future [52]. This can improve students' communication skills because it

has flexibility that can eliminate the gap between teachers and students [53].

IV. CONCLUSION

Based on the presentation and analysis of data, it can be concluded that cybergogy-based blended learning can improve students' speaking and presenting skills. This skill improvement can be seen from the difference in student learning outcomes in the experimental and control classes. This is influenced by collaborative learning (online and offline) that involves students in a complete, purposeful, and planned manner inside and outside the classroom. However, to maximize learning output, all elements of education, starting from principals, teachers, students, and parents, need to synergize to create an active and conducive learning climate.

Furthermore, it is suggested that teaching staff apply cybergogy-based blended learning so that the teacher's role as a facilitator and motivator is more optimal in developing students' competencies and skills in active learning situations. The implementation of online learning should be supported by a Learning Management System (LMS) so that students are more motivated and independent when learning. Consequently, students are more active in developing knowledge and competencies to answer the challenges of 21st-century skills in the form of 6C (Citizenship, Character, Critical Thinking and Problem Solving, Communication, Creativity, and Collaboration).

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