

Digital Learning: An SDG Textbook Project

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Reference Data

Silsbee, S., & Clark, K. (2026). Digital learning: An SDG textbook project. In B. Lacy, M. Swanson, & H. Yoder (Eds.), *Language S: Learning, Teaching, Assessing – JALT 50 Years – Challenges and Perspectives*. JALT. <https://doi.org/10.37546/JALTPCP2025-03>

This paper outlines the development process of an in-house digital EFL textbook for first-year university students in Japan. The methodological framework used to develop the materials integrated the themes of the Sustainable Development Goal (SDG), adopting a skills-based approach to communicative competence and using the Common European Framework of Reference for Languages–Japan (CEFR-J). To support ongoing revision and improvement, the authors adopted the Successive Approximation Model (SAM), which allows materials to be developed, tested, and refined through repeated cycles of feedback. Piloted over two academic quarters, the textbook demonstrated that skills-focused instruction supports sustained discussion and strategic competence. Feedback from instructors and students then informed ongoing revisions to each unit. The digital format enabled immediate updates and flexible adaptation of materials throughout the development process. The authors discuss how SAM supported the design of the materials and advocate for an agile design approach to the creation and continuous improvement of digital learning materials.

本稿は、日本の大学1年生を対象として開発されたデジタルEFL教材の開発過程を報告する。教材開発には、持続可能な開発目標 (SDGs) のテーマを取り入れるとともに、コミュニケーション能力を技能別に捉える手法を採用し、CEFR-Jを枠組みとして活用した。教材の継続的な改訂と改善を可能にするために、逐次近似モデル (SAM) を導入し、フィードバックを基にした反復的な開発・試行・改善を行った。教材は2学期間にわたって試験運用され、その結果、技能重視の指導が持続的なディスカッ

ション能力および方略的能力の育成を支援することが示された。また、教員と学生からのフィードバックを各ユニットの継続的な改訂に反映させた。デジタル形式により、開発過程での即時更新や柔軟な調整が可能となった。

本稿ではSAMが教材設計において果たした役割について考察し、デジタル教材の開発と継続的改善にはアジャイル型の設計手法が有効であることを提唱する。

As the needs of language learners continue to evolve, the integration of digital resources into language education has become increasingly vital, especially in globalized contexts (Zou et al., 2025). At the same time, the possibilities of digital materials are expanding very rapidly, creating new opportunities for interactive learning experiences. These developments call for more flexible approaches to digital materials design with revisions that can be done both quickly and effectively to adapt to the continuously changing needs of students. Creators of English as a Second or Foreign Language programs face the daunting task of not only developing linguistic competence in learners but also promoting meaningful participation in globally relevant interactions (Xu et al., 2025; Yaccob et al., 2022).

Having taught compulsory freshmen discussion courses at a large university for 10 years, the authors became aware of a lack of appropriate materials. In 2023, they were tasked with creating a textbook that, rather than focusing mainly on linguistic aspects, created opportunities for critical thinking and sustained communication, stressing the need for more authentic content, digital accessibility, and pedagogical flexibility. This approach is supported by Fuentes and LaBad (2025), who found that interactive technologies support the development of autonomy, competence, and collaboration, all of which are crucial for improving student motivation, engagement, and achievement. The project we describe in this paper is the result of the authors' desire to create an equitable, skills-focused and future-ready EFL resource appropriate to our context.

This paper examines the design and creative process of *Global Visions: Practical Discussion Skills*, an in-house digital EFL textbook developed for first-year university students in Japan. The title was chosen based on the textbook's strong connection to

SDGs on a global scale and the use of visual aids to facilitate activities. The project aimed to achieve three objectives:

- Align CEFR-J with SDG-based themes
- Adopt a skills-based approach to foster communicative competence
- Leverage digital media to enhance authenticity and engagement

The resulting textbook represents an attempt to bridge language education and global citizenship through communicative, digitally mediated learning experiences.

International projects such as the United Nations' Sustainable Development Goals (UN SDGs) have become central to educational discourse. According to the UN website, these goals were adopted in 2015 as “a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity” (United Nations, n.d.). While these goals may seem general, many of them are relatable to university students. Students can apply their own personal experiences and then expand upon them to encompass the goals on a national or global scale. For example, in Unit 4 of the textbook, discussing SDG goal 4, quality education, students can reflect on their own experiences in the Japanese education system. They can then build on their own experiences to think critically about issues outside of their immediate context, comparing educational access and quality in different global settings, and developing a broader understanding of educational opportunities worldwide (see Appendix A).

To assist in bridging the gap between theory and practice, the authors decided to adopt the Common European Framework of Reference for Languages for Japan (CEFR-J) as a tool to structure the curriculum. CEFR-J is an adaptation of the original CEFR, which evaluates learners' language abilities using can-do statements. Its descriptors have been tailored specifically to Japanese learners. In the CEFR Companion Volume, descriptors for mediation, online interaction, and communication across languages and cultures—referred to as plurilingual and pluricultural competence—are expanded. The use of SDG discourse and digital media content aligns well with communicative tasks such as practical discussion (Council of Europe, 2020).

The following sections explain the theoretical background of the textbook project, module design, and digital materials employed in the textbook, followed by a brief consideration of its limitations and future potential.

Background

Course Overview

This project was carried out at a Japanese university over the 2023 and 2024 academic years. In 2023, the authors were asked by the Director of the university's Center for Language Education to create an in-house textbook for a pre-existing course focused on practical discussion skills. This is a compulsory course for first-year students in the Faculty of International Humanities, Department of International Exchange Studies. It is conducted over two academic quarters, each consisting of thirteen class sessions. Students are placed into three classes based on scores from a university-wide English proficiency test at the beginning of the academic year. Most students fall within the A2 and lower B1 range on the CEFR scale, with some outliers at the A1 and B2 levels. They are assigned a grade after each quarter, based on weekly assignments and vocabulary quizzes, participation in SDG-related discussions, two speaking tests, and a final written report.

The primary aim of the course is to improve students' oral communication skills in English. In its former iteration, the course used a communicative textbook that highlighted vocabulary and phrases intended to support English conversation. Although the textbook contained pair and group work and listening activities with authentic speech, the scope of the book and its activities did little to help critical thinking skills or promote deeper levels of discussion. The authors decided to produce a digital textbook and offer it to students in an editable PDF format free of charge after many students expressed concern that textbooks were too expensive. Students could either print out hard copies of each unit or access the PDF on their mobile devices or laptops during class. Having coordinated the course over the last ten years, the authors were familiar with the established needs of the students and recognized that the textbook should offer students opportunities to work on the following:

- Learn and understand the meanings of new vocabulary items
- Use skills to help them navigate conversations and discussions in English
- Understand natural speech and a variety of accents when listening
- Use existing background knowledge to help facilitate conversations and discussions
- Develop critical thinking skills to form and support opinions

The new textbook was piloted over two quarters in the fall of 2024. In the following sections we will discuss how the CEFR-J was used to guide the materials development, using SDGs as content and incorporating a skills-based approach.

CEFR-J as Framework

The authors selected the CEFR-J as the textbook's structural core because the course was being designed for Japanese students. The CEFR-J was useful because it is structured in a way that allows for more precise separation of student abilities at lower proficiency levels. Both authors had extensive experience working together previously at a university in Osaka, reforming the English program around CEFR-J can-do statement criteria and were familiar with how to use it as a design framework. Fortunately, the instructors who would be teaching the classes at their current university also had a good understanding of the framework and felt it offered a convenient way of communicating goals and approaches.

Another benefit of using CEFR-J is that the descriptors reflect the reality Japanese learners face when studying English (Tono, 2019). This is relevant because Japanese learners do not necessarily demonstrate the same proficiency when placed within a level (Koizumi et al., 2022). The distinction of sub-levels within each main level (e.g. A2.1, A2.2, A2.3, etc.) made the creation of activities easier as each activity had a clearly defined outcome related to the descriptors. For example, target vocabulary in each unit was taken from the CEFR-J vocabulary list to match student proficiency at the A1-B1 levels.

Learner autonomy is suggested to support higher levels of intrinsic motivation (Okumus Ceylan, 2021), so getting students to take their learning into their own hands was one goal of the authors. The CEFR-J descriptors offered specific explanations and enabled students to measure their own development as they progressed through the textbook. The self-assessment section at the end of each unit provided a checklist of unit descriptors to help students recognize areas of achievement and improvement. Instructors reported that the checklists were useful to help identify areas of the textbook that could benefit from revision.

The CEFR-J framework and the SDGs complement each other well (Bergman et al., 2018). The descriptors, while specific, are flexible enough to incorporate SDGs. This content often raises questions that enable learners to consider their own opinions on global issues, thereby further enhancing learner autonomy, as students are compelled to rethink existing beliefs and assumptions.

SDGs and Content

The authors were asked to incorporate content and themes related to the SDGs. One advantage of using SDGs is that they cover a wide spectrum of subjects and are interrelated to accommodate almost any topic. For example, Unit 4 of the textbook examines Quality Education (Goal 4), but also connects to other goals, such as Decent

Work and Economic Growth (Goal 8) and Sustainable Cities and Communities (Goal 11). These can be seen in the Unit 4 discussion questions (see Appendix A).

This directive did, however, present several challenges, the first of which being that SDG-based content is often complex (Hansen et al., 2021) and the vocabulary involved often goes beyond the CEFR A2-B1 level (Benigno & de Jong, 2019). To reduce the impact of complex and often abstract subject matter, the decision was made to use general topics that are related to the SDGs rather than concentrate on the SDGs themselves as the main content. As a result, although the first unit of the textbook introduces SDGs and sets the format to which each unit adheres, the remaining units use topics that can be applied to students' everyday lives (as per the tables below).

In their study on learners' reading comprehension of SDG material, Seva et al. (2023) note that SDG concepts and vocabulary are often outside the knowledge base of students and can be detrimental to understanding, putting them at a disadvantage when they enter the future job market. This was the case when using the previous textbook, as students demonstrated frustration and difficulty incorporating vocabulary from the textbook into conversations based on social issues. Using the CEFR-J Vocabulary Wordlist (Tono, 2017), the authors identified vocabulary from the A1 to B1 levels that they hoped would be manageable for students, although some vocabulary items fell outside the B1 list. Overall, approximately two-thirds of the vocabulary used and tailored to SDG subject matter in the textbook were taken from the A1-B1 levels of the CEFR-J Vocabulary Wordlist (see Appendix B).

Module Design

Needs and Skills

Both the newly set course objectives and previously stated drawbacks of the former textbook contributed to the authors' decision to choose a skills-based approach for the new design. Communicative research supports the claim that oral communication demands more than basic rote memorization of vocabulary and set phrases (see Canale & Swain, 1980; Celce-Murcia et al., 1995; Kramsch, 2006). Recognizing that designing the textbook around receptive and productive skills rather than themes or grammatical structures would help promote communicative ability (see Dos Santos, 2020; Kadhim & Mohsein, 2024), the authors took advantage of the flexibility that the topics provided and assigned specific skills to each unit, with skills being recycled throughout the textbook. Table 1 presents the needs that the authors felt were important for students as outlined in the CEFR-J framework, along with corresponding skills.

Table 1
Perceived Student Needs and Corresponding Skills

Student Needs	Skills
Understand new vocabulary items	Contextually inferring meaning of new vocabulary items
Use strategies to navigate conversations and discussions in English	Turn-taking, negotiating meaning, asking follow-up questions, interrupting
Understand natural speech and a variety of accents when listening	Listening for main ideas and details while adjusting for accent variations
Use existing background knowledge to help them facilitate conversations and discussions	Giving descriptions and extra information, referencing past experience, comparing and contrasting, giving advice
Develop critical thinking skills to form and support opinions	Identifying different types of statements, making inferences

Intermediate Practical Discussion Skills I and II are separate, one-quarter courses with independent assessment, and require students to pass the first course before taking the second. The syllabus structure for each course is presented in Table 2 as a single format for ease of comparison.

Table 2
Class Syllabus Content and Structure

Fall Semester: First Quarter

Class	Unit No. & Topic	Skills Or Objectives
1-2	1. SDG Introduction	Identifying statements of fact, value, and policy
3-4	2. Fast Food	Giving extra information
5	REVIEW UNITS 1 & 2 *	<i>Speaking Test</i>
6-7	3. Outdoor Activities	Asking follow-up questions
8-9	4. Education and Learning	Repetition and clarification
10-11	5. Employment	Giving reasons
12	REVIEW UNITS 3, 4 & 5 *	<i>Speaking Test</i>
13	Course Review	Final Report Assignment

Fall Semester: Second Quarter

Class	Unit No. & Topic	Skills Or Objectives
1-2	6. Media & Technology	Comparing and contrasting
3-4	7. Going Green	Inferencing
5	REVIEW UNITS 6 & 7 *	<i>Speaking Test</i>
6-7	8. Personal Challenges	Interrupting to give advice
8-9	9. Countries & Culture	Giving descriptions
10-11	10. Money & Finance	Giving others a chance to speak
12	REVIEW UNITS 8, 9, & 10 *	<i>Speaking Test</i>
13	Course Review	Final Report Assignment

Note. * = To maintain the pace of the course, review units may be assigned as homework.

Activities

Recent SDG research suggests that integrating SDG themes into EFL instruction can enhance learner engagement, critical thinking, and global citizenship while providing authentic contexts for communication and language development (Yu et al., 2024). Furthermore, tasks such as discussions, collaborations, and problem-solving, promote active learning and can support both language development and SDG education (Bekteshi & Khaferi, 2020; Astawa et al., 2024). The authors took great care to create exercises that would create opportunities for students to engage in such activities.

Activities in each unit were consistently sequenced and designed to provide comprehension scaffolding to prepare students for discussion and reflection. Each unit spanned ten pages and was taught over two class periods. As shown in Table 3, the first class exposed students to integral receptive skills, followed by more productive communicative activities in the second lesson.

Table 3
Unit Structure and Activity Sequence Across Two Class Sessions

Class	Stage	Description	Content/Focus
1	Warm up	Schema activation activities designed to prompt students to think about and engage with the unit topic	Activating prior knowledge; introducing SDG-related themes
1	Vocabulary practice	Presentation of fifteen decontextualized vocabulary items, followed by matching tasks and controlled practice activities	Definition matching; fill-in-the-blank exercises; simple Q&A using target vocabulary
1	Reading	“Talking heads” format texts presenting multiple perspectives and opinions related to the unit theme	Reading for gist and detail; understanding differing viewpoints
1	Listening	Audio dialogues featuring diverse accents and authentic situations connected to SDG-related content	Comprehension of real-world speech; exposure to varied English accents
2	Discussion Skills	Pair and group work activities focusing on the development of specific oral communication skills	Turn-taking, asking for clarification, expressing opinions
2	Expansion Activity	Extended communicative tasks that build on prior activities to deepen engagement	Collaborative discussion; application of vocabulary and ideas
2	Self-check	Reflective checklist allowing students to evaluate their achievement of unit learning objectives	Self-assessment; metacognitive awareness

Digital Materials

By electing to implement a fully digital textbook, students have access to audio files that can be downloaded. For those with limited storage on their devices, they may also access these files via streaming on the Internet. The same flexibility applies to the digital PDF of the textbook itself. A printer-friendly version of the PDF is available for those who prefer a hard copy, which may aid in deep reading and cognitive pacing (Swanson et al., 2020; Altamura, 2024). By following principles of the Universal Design for Learning (UDL), all materials are provided in a framework that provides flexible access to meet the needs of all learners proactively. A combination of flexible modalities (text, voice) and redundant scaffolding can be linked to higher engagement and perceived learning (Chen & Tsai, 2025).

Using an agile curriculum that emphasizes continuous improvement and data-informed adjustments is a key factor in a successful digital learning media ecosystem (Aluko-Daniels, 2022; Bates, 2019). Specifically for piloting the textbook, rapid prototyping and the Successive Approximation Model (SAM) approach were chosen to revise and update units quickly during piloting. The SAM approach ensures that task and model design elements work together to make image segmentation accessible and versatile, while the model design leverages state-of-the-art techniques to provide accurate and rapid segmentation results (ELM Learning, n.d.; Distance Learning Institute, 2025). After each unit was completed during the pilot, feedback on that unit was used to guide revisions for future units. Changes to the files that students can access could be made instantly and updated remotely in time for the next lesson. Refining scripts, unit-themed tasks, pacing, and task instructions could potentially be done immediately across all student-accessible files.

Multimedia Creation

To supplement activities and provide a more authentic and engaging learning experience, the textbook leverages the use of original, high-quality media content (graphics, visuals, audio) to accomplish real-world authenticity, provide scaffolding for more rapid iteration, and allow for more engaging pedagogical control. In the textbook’s conception, balancing media authenticity and quality with complete creative control was a priority. Dialogue models for listening activities were created in line with CEFR guidelines for A1-B1 learners, using modern text-to-speech (TTS) via the Eleven Labs Voice AI Platform. Dialogue was augmented by open-license audio to create background noise and sound effects to add authenticity to conversations. Visuals were made using

open-license photographs/vector images obtained through the website Pixabay. Page layouts and graphics were done entirely by the authors.

In this way, the commitment to all-original content ensured no licensing conflicts, and quick and flexible revision cycles compatible with SAM, giving the authors the ability to receive feedback from pilot classes in a non-linear approach and make swift changes to accommodate future lessons (Distance Learning Institute, 2025; ELM Learning, n.d.). For example, issues related to the difficulty of the listening activities in the earlier units in the textbook that were discovered through feedback were resolved. As a result, listening sections in future units could also be modified in similar ways to address the issues before students began their study of those units (see Appendix C).

Media and Integration

To enhance student engagement and provide visual contextualization of SDGs, all layouts and graphic design choices were guided by Mayer's Cognitive Theory of Multimedia Learning (Mayer, 2009). Mayer's theory suggested that students build mental representations of concepts through visual supplements and learn more deeply from a combination of pictures and words than from words alone. All layouts and graphic design choices were designed to adhere closely to this principle. Using signaling, a consistent visual structure was maintained throughout each unit. Captions and text were positioned next to visuals to provide spatial contiguity. Large sections of media were segmented into smaller individual tasks to avoid cognitive overload. In this way, the activities in the book support active processing and transfer (Mayer, 2009; Waxman & Goldie, 2023).

To aid in perception and comprehension during the pilot, CEFR-based dialogues were created with TTS voice models to represent diverse varieties of English pronunciations and speaking profiles (CAST, 2018). In line with the global theme of the textbook, speech profiles from a variety of cultures internationally were used to promote diversity and further align with the theme of the textbook. Using speed controls, the speaking rate in each TTS-generated audio file can be easily adjusted and customized further. TTS speech was then combined with ambient background noise to establish subjects in the locations referenced in the textbook through open-license audio via the Pixabay database.

After completion of the audio files, images from the database were then chosen to match subjects and topics based on context and the desired learning outcomes of each individual task. The Pixabay Content License allows free use, adaptation, and redistribution, with no attribution required (Pixabay, n.d.). It is important to note

that some restrictions remain. Prohibitions on using content, such as misleading endorsements, no standalone resale of images or sound, and caution with identifiable persons or trademarks, would constitute a violation of the content license summary. University and educational guidelines were followed in accordance with the Pixabay Content License Summary to ensure that the use of all media collected in this manner was ethically and lawfully integrated into the textbook's educational materials.

All media assets were created alongside textbook activities to ensure they were task-integrated. Listening dialogues and photos that were used reflect the target communicative functions of each section, providing visual and auditory cues to accommodate dual-channel learning and aid in comprehension (Mayer, 2009). In addition, an accessible layout structure for graphics connected to tasks and proper signaling provides scaffolding for mediation activities. This aligns with CEFR's action-orientation as well as both communicative language teaching and Task-Based Language Teaching (Council of Europe, 2020; Ellis, 2003; Ellis et al., 2019).

Limitations and Future Developments

The final version of the textbook used for the pilot showed promise. However, some aspects still required improvement. Several errors (typos, unclear instructions, etc.) were pointed out throughout the book by both teachers and students. Teachers felt activities in the listening sections that called for students to match images to corresponding question items were not accurate and reported that students experienced confusion. The content itself, even when modified to make it more accessible, remained challenging at times and hindered students' ability to communicate. Additionally, while the teachers involved were all familiar with both CEFR-J and the SDGs, success in other programs would depend on the experience of instructors in those programs.

Future developments will include resolving the limitations just described by correcting any identified errors, replacing some problematic images with better representations, and reviewing options that may make the content more accessible. In addition, future measures will be taken to collect feedback from both teachers and students to assess the effectiveness of the textbook. Adding interactive elements such as video dialogues, gamified tasks, and speech recognition is also possible. Digital tools and platforms, while powerful, are only effective when they actively foster meaningful interaction, participation, and motivation. Future research should therefore explore how specific pedagogical strategies, content formats, and feedback mechanisms can enhance engagement in digitally mediated environments, particularly in hybrid and fully online settings.

Bio Data

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Appendix A

Activity to Increase Topic Relevance

UNIT 4

Discussion Practice:

With a partner/group, have a short conversation about education and learning. Try to ask for repetition and clarification in the conversation. Below are some questions and ideas that might help you. Choose one and then prepare some notes below.

- Which subjects did you enjoy studying in high school? Which did you not like?
- What job do you want in the future? What subjects do you need to study for that job?
- How does learning about other cultures improve critical thinking?
- What do you like about going to school? What do you dislike?
- Talk about a memory you have from school.
- Think of a Sustainable Development Goal. What school subjects are connected to that goal?

Before having your conversation, use the space below to organize your ideas into vocabulary, questions, and things you would like to say:

VOCABULARY: _____

QUESTIONS: _____

EXTRA INFORMATION: _____



Appendix B

Vocabulary Based on CEFR-J Wordlist

UNIT 4



Vocabulary:

Unit 4 Vocabulary		
adult education	lecture	special education
cultural education	critical thinking	STEM education
hands-on	online	technology
higher education	private school	trade school
holistic education	public school	visual

Match the words in each group to their correct meanings.

- | | |
|--------------------------------------|--|
| 1. <u> d </u> trade school | a. learning about science, technology, engineering, and math |
| 2. <u> </u> STEM education | b. learning by doing, trying things out, touching, and experimenting |
| 3. <u> </u> holistic education | c. learning about everything—our minds, bodies, feelings, and the world around us |
| 4. <u> </u> special education | d. where people go to learn specific skills for certain jobs |
| 5. <u> </u> hands-on | e. learning for people who need extra help because they have different learning needs or challenges |
| 6. <u> </u> lecture | f. connected to other computers through the Internet |
| 7. <u> </u> online | g. college or university |
| 8. <u> </u> adult education | h. programs that allow people who are older to study and learn |
| 9. <u> </u> public school | i. a long talk on a particular subject that someone gives to a group of people, especially to students in a university |
| 10. <u> </u> higher education | j. free local school, especially in the US and Scotland, controlled and paid for by the government |
| 11. <u> </u> visual | k. schools that are paid for by students or their families |
| 12. <u> </u> critical thinking | l. connected to seeing |
| 13. <u> </u> cultural education | m. forming opinions and decisions by asking questions and considering different viewpoints |
| 14. <u> </u> private school | n. machines and equipment usually related to science and computers |
| 15. <u> </u> technology | o. learning about and understanding different groups of people from around the world |

Appendix C

Comparison of SAM Revisions

Original textbook page prior to SAM-based revision (below) and revised textbook page (next page) after following the SAM.

UNIT 4

Listening:



08

A. Listen to the conversations. Where is each conversation taking place? Write the name of each location on the line below.

CONVERSATION 1

CONVERSATION 2

CONVERSATION 3

CONVERSATION 4

CONVERSATION 5

B. Listen again. What are the people talking about?

Conversation 1: _____

Conversation 2: _____

Conversation 3: _____

Conversation 4: _____

Conversation 5: _____

C. Answer True (T) or False (F) for each statement.

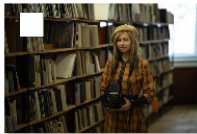
- The woman is taking an advanced computer class. _____
- The women think studying psychology can help to get a job in business. _____
- The professor offers to speak faster in class. _____
- The man studied abroad for a year. _____
- The woman's private school had small classes and was very strict. _____

UNIT 4

Listening:

A. Look at the pictures and listen to the conversations. Match each conversation to the correct picture. One picture will not be used.

08



B. Listen again. What are the people talking about? Circle the correct answer.

- | | | | |
|-----------------|-----------------------|--------------------|-----------------------|
| Conversation 1: | public/private school | adult education | special education |
| Conversation 2: | higher education | trade school | cultural education |
| Conversation 3: | technology | holistic education | a lecture |
| Conversation 4: | cultural education | hands-on learning | technology |
| Conversation 5: | higher education | adult education | public/private school |

C. Answer True (T) or False (F) for each statement.

1. The woman is taking an advanced computer class. _____
2. The women think studying psychology can help to get a job in business. _____
3. The professor offers to speak faster in class. _____
4. The man studied abroad for a year. _____
5. The woman's private school had small classes and was very strict. _____