Academic Support for All Students Based on Reasonable Accommodations in Emergency Situations Using AI Chatbots

Noboru UENO[a&b]*, Hiroyuki MITSUHARA[c] & Masami SHISHIBORI[c]
[a] *Graduate School of Advanced Technology and Science, Tokushima University, Japan*
[b] *Faculty of Human Life Science, Shikoku University, Japan*
[c] *Graduate School of Technology, Industrial and Social Sciences, Tokushima University, Japan*
* c501947004@tokushima-u.ac.jp

Abstract: Shikoku University in Japan has implemented a plan to improve academic support for all students, especially those who need reasonable accommodations for their disabilities, so that they can spend their time at the university in a meaningful way and with peace of mind. In this context, we conducted a questionnaire survey to determine the best way to communicate with the students who are provided with reasonable accommodations to support their studies and to take classes remotely during the COVID-19 pandemic. Almost all of the respondents requested an easy way to communicate with the faculty members via the LINE Social Networking Service (SNS),. We propose the use of an AI chatbot using LINE as a learning support plan for emergency situations such as COVID-19 and disasters.

Keywords: safety education, reasonable accommodations, academic support, AI chatbot, SNS

1. Introduction

The university's response to the reasonable accommodations initiative began in 2016 when the Disability Discrimination Elimination Law was introduced, and comprises a detailed consideration plan for students wishing to take part. As a complement to existing learning support, the initiative improved the learning environment for all students, not just those who have been granted reasonable accommodations, and this, in turn, has supported the effectiveness of further university education.

Considerations for each disability in reasonable accommodation are as follows.

· Physical disability: cerebral palsy, muscular dystrophy, etc.
  Consideration for classroom mobility and use of dedicated computers and tablets
· Hearing disability: Deaf.
  Consideration of seating positions where the mouth is visible and methods of communication.
· Visual impairment: blindness, low vision, etc.
  Consideration for Classroom Movement and Reading.
· Developmental disabilities: autism spectrum disorder, attention deficit/hyperactivity disorder, etc.
  Effective use of PCs and tablets, avoidance of ambiguous expressions, etc.
· Mental disorder: depression, schizophrenia, etc.
  Consideration for seat assignments, late arrivals and departures, and absences.
· Weakness, epilepsy, etc.
  Treatment of absences due to hospital visits, etc.

As part of the promotion of mental health and the prevention of mental health problems, Shikoku University conducts a survey, through questionnaires, of the concerns of all students in their first year. While students sometimes apply for accommodations based on this questionnaire, it has also been reported that students expressing needs beyond the norms of the questionnaire can have problems with absenteeism from classes and motivation to study, and this is typically due to mental health issues. Students with depression in particular, are often re-interviewed alongside their parents, and, as a result, such students sometimes apply for reasonable accommodations. A common problem in higher

education institutions worldwide is that students with mental health disorders, such as depression and autism spectrum disorder, tend not to voluntarily apply for accommodations. For students with such mental health disorders and for students in the 'grey area', who show symptoms that do not meet diagnostic criteria despite having characteristics of developmental and mental disorders, anxiety about their new environment is thought to be a factor in absenteeism, and some students may even be forced to leave school as a result.

Figure 1 shows the flow of correspondence between students who need academic support, especially reasonable accommodations, and related faculty members, from the time the students enter university to graduation. This correspondence can be broadly classified into three types.

(a) All first-year students are surveyed about their concerns, and depending on the circumstances of each new student, a tutor will consult with them and, if necessary, ask them to apply for reasonable accommodations.

(b) The application procedure for the provision of reasonable accommodations: application, interview, review/approval, planning, agreement/signature, start of accommodations and a series of application procedures.

(c) Tutors are available to all students for consultation and inquiries regarding daily university life and academic support. Tutors also provide support to students who receive reasonable accommodations, such as consultation on accommodations, re-evaluation and re-examination, until graduation.
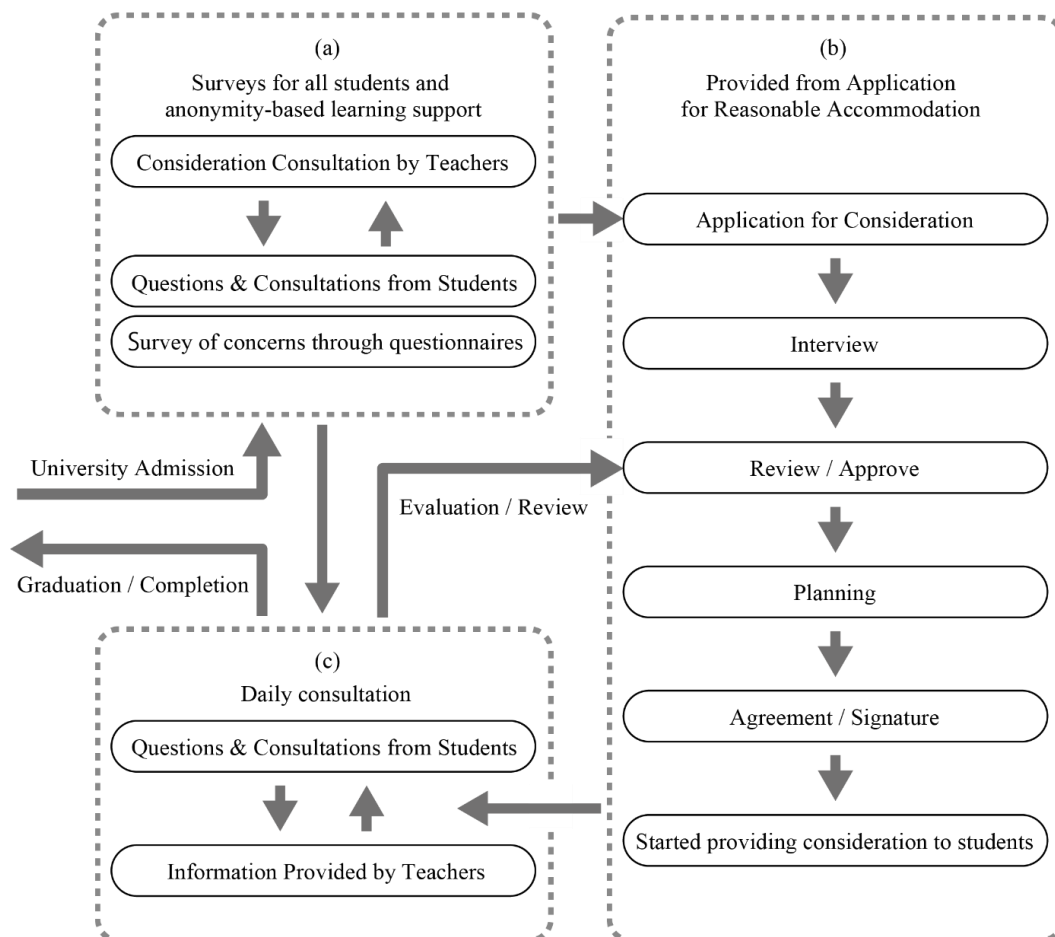

Figure 1: The general flow of learning support and reasonable accommodations from admission to graduation.

However, since there may be a limit to the amount of learning support that the university can provide, a comprehensive accommodations plan that includes both the university and the student's home is essential. In addition, about 70% of all students at Shikoku University are female (FY2019), and it has been reported that it is important for women to understand and support their parents at home. Thus, reasonable accommodations need to be understood and supported by the university, the student and the student's family.

In terms of web accessibility, the user interface (UI) and functions of Shikoku University's home page and the portal site used by students are not much different to those of other universities in Japan. In fact, web accessibility and the provision of learning support services that utilise websites is generally poor in universities worldwide.

With this in mind, a questionnaire survey entitled 'About portal site for consideration only' was conducted with five students from the department who had already been provided with reasonable accommodations regarding the current accessibility of the homepage and the portal site of Shikoku University.

2. Results of the questionnaire on the portal site project

2.1 Results of the Questionnaire Survey

In the questionnaire, we asked 11 questions anonymously from a web-only questionnaire page. All respondents were female, and there were five degrees of disability in total: three students had mental health disorders, one had a mental and hearing disorder and one had deafness. In line with previous research, the proportion of women with mental health disorders was much higher than that of men. Table 1 shows the questions and responses.

Table 1. *Survey Results*

Questions	Student A	Student B	Student C	Student D	Student E
Q1: What is your preferred way to contact university faculty and staff members?	Portal site e-mail	e-mail	SNS such as LINE, e-mail	SNS such as LINE e-mail	SNS such as LINE e-mail
Q2: Do you need to ask questions about university life, such as about lectures, on the site?	Necessary	Necessary	Necessary	Necessary	Necessary
Q3: On the site, do you want to create new applications, make changes or suspend reasonable accommodations?	Necessary	Unnecessary	Necessary	Necessary	Necessary
Q4: Do you wish to check the contents of the current accommodations plan on the site?	Necessary	Unnecessary	Necessary	Necessary	Necessary
Q5: Do you wish to check today's lecture schedule via a listing on the site?	Don't know	Necessary	Necessary	Necessary	Necessary
Q6: Do you wish to pre-book a classroom seat on the site?	Necessary	Unnecessary	Don't know	Don't know	Necessary
Q7: When you cannot attend a class, would you like to access it online?	Necessary	Necessary	Don't know	Necessary	Don't know

Q8: When you take a break from a lecture, do you wish to check alternative assignments on the site and upload submissions?	Necessary	Necessary	Necessary	Necessary	Necessary
Q9: Do you have any other requests related to accommodations that should be added?	No	No	No	No	Check if each subject teacher remembers the accommodations, allow anonymous consultation
Q10: If you were to use such a site, are there any concerns that you might have about it?	No	No	No	No	No
Q11: What do you think is the most important support to allow you to graduate?	None	An environment where it is easy to consult for credits, courses and absences	None	Like other students, I just want them to support me	Support for reasonable accommodations until graduation and support for job hunting

2.2 Analysis of Results

Concerning the students' preferred method of contacting the university in Q1, all of the respondents answered that it would be convenient for them to use existing, familiar communication methods such as e-mail and Social Networking Service (SNS), and convenience was considered the most important factor. Regarding contact via the university portal site, although some students answered that they needed this, the current system allows university faculty members to contact students, but the reverse is not possible.

Q2 to Q8 relate to the type of system required for the web application planned in the future. Of these 'general questions relating to issues such as lectures and missed lectures', the students mainly responded that these functions were needed, and that a counselling service in a dedicated portal site was essential. In addition, in response to Q5 and Q7 (confirming class schedules on the day and online classes in the case of being absent), most of the students answered that this was necessary. For Q3, Q4 and Q6, more students said that these facilities (application for or modification to an accommodation plan, checking the current accommodation plan and booking a seat, respectively) were necessary than said they were not.

One of the responses to Q9 also anonymous consultation, so it would be advisable to set up a separate 'Anonymous consultation desk' for asking questions about university life.

None of the students reported problems with the site Q10, but we would still like to consider any potential concerns in advance and devise solutions. In all circumstances, maximum privacy should be assured.

For Q11, most students said that 'consultation and support' was the most important requirement for graduation. Thus, communication with students is the primary objective of the dedicated portal site plan, and this must be reflected in the design.

2.3 The Role of Tutors, Based on the Questionnaire Results

Most first-year students have few friends at first and are not familiar with the university environment or with teachers' names, so most experience a certain amount of anxiety in the initial months of university. During these early days, it is difficult to exchange information using SNS for the above reasons, so faculty members often simply ask students questions such as 'How are you feeling?' and 'Do you have any concerns?'. In this way, they attempt to relieve the students' stress.

Students enrolled in a class may also be asked to help as tutor support. We plan to train such students as peer tutors and offer a financial reward for each instance of support given. In this way, it will be possible to provide substantial accommodations by obtaining the cooperation of students as well as faculty members. In the future, a questionnaire survey on reasonable accommodations will be conducted among faculty and staff who provide them, and, based on the results, we will continue to offer information and practical training on disability awareness to all faculty and staff.

2.4 Responding to students in an emergency situation

The role of tutors has increased in recent years as part of the measures to prevent the spread of the COVID-19 pandemic. Normally, we can provide face-to-face support, but in the current pandemic, we tend to support students by e-mail and SNS. Under these circumstances, we believe that we can provide more useful support for students by incorporating AI chatbots into SNS and other services.

3. Plan for Conversational Chatbot Using SNS

3.1 Benefits of Conversational Chatbots

Chatbots are beginning to be used in educational institutions as part of academic support services and are being discussed in international conferences as part of research on innovative computing and communication. However, the problem is that professional research on academic support services, including reasonable accommodations, is an issue for future research.

Most of the students who completed the survey expressed a desire to use SNS to contact faculty and staff. A number of researchers have noted the utility of communication using such web applications, and we would like to actively promote of their use. Conversational chatbots can be used to great effect to address the time demands involved in contacting large numbers of students. In particular, chatbots are considered the best tool for gathering information about students' current situations, because they can establish a more friendly and empathetic relationship than traditional point-and-click interfaces.

3.2 AI Chatbot Planning

Chatbots do not need to replace the human role nor completely mimic human conversations, as their purpose is to help people, facilitate work and allow the use of language to interact with computers. However, care must be exercised to avoid emotional communication that may cause irritation or misunderstanding. Therefore, avatar images should be displayed as an additional method of emotional expression in students' social media, and these will act as an incentive to continue using the chatbots.

We therefore divided web accessibility into three modules, as shown in Figure 2.

(a) All new students are targeted, and the AI chatbot is used to provide academic support, such as questionnaires and consultations, with a focus on anonymity. We emphasise the anonymity of the conversation function, which allows anyone to ask questions and discuss freely without the need for an account.

(b) Students who wish to receive reasonable accommodations can receive support from the start of the application process to the provision of accommodations using a Social Networking Service (SNS), based on an AI chatbot. To receive this support, an SNS account is required to identify the individual.

(c) All students are provided with an AI chatbot to support them in their study, such as daily consultations. For this each student is required to have a social network account, and while we value privacy, we also emphasise the importance of facilitating daily conversations with tutors and others when necessary.
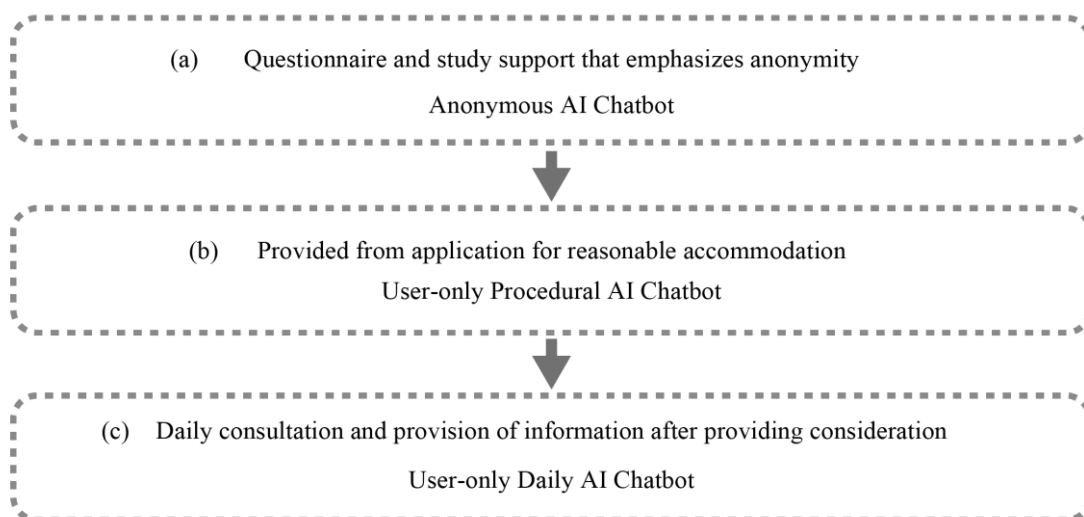

Figure 2: Three modules and the roles required for web accessibility.

Web accessibility must not only consolidate necessary functions and be performed based on optimal policies and security, but also facilitate the natural language understanding and sentiment analysis necessary to produce a response. We believe that better web accessibility can be realised by

analysing changes in the number of student users, the correct answer rate, changes in the number of conversations and so one. This information can then be used to make future changes.

The detailed functions and features of each module will now be explained with reference to Figure 3.

(a) The first step is to offer a web accessibility site that is open to all university students, with its main feature being that anyone can consult anonymously. The avatar of the robot is always displayed with the words, 'This is a chatbot for anonymous questions and consultation,' so that even students who are visiting for the first time will be encouraged to participate. A button with a label such as 'Comment to your teacher', which allows you to consult directly with the teacher for a solution, is also provided at the bottom of the screen so students can be guided to the next step and receive a more detailed response. Here, it is important to determine extent to which each student needs reasonable accommodations.

(b) The next step is for students to log in to their SNS account (LINE) to enable more detailed procedures. The next steps can then take place application for accommodations, the appointment for the interview, notification of examination/approval, plan guidance, agreement/signature, notification of the start of accommodations provision and a series of application procedures. However, the plan can also be changed at this stage, even for students who have already received accommodations.

(c) As a final step, a student-only SNS is made available for students who haves already received accommodations, including daily questions and counselling based on the accommodations plan, such as alternative tasks when absent due to poor physical health. The teachers in charge will guide the staff in leading more specific tasks. In addition, faculty staff can send out information and conduct questionnaires, which can then be used for various communication with students.
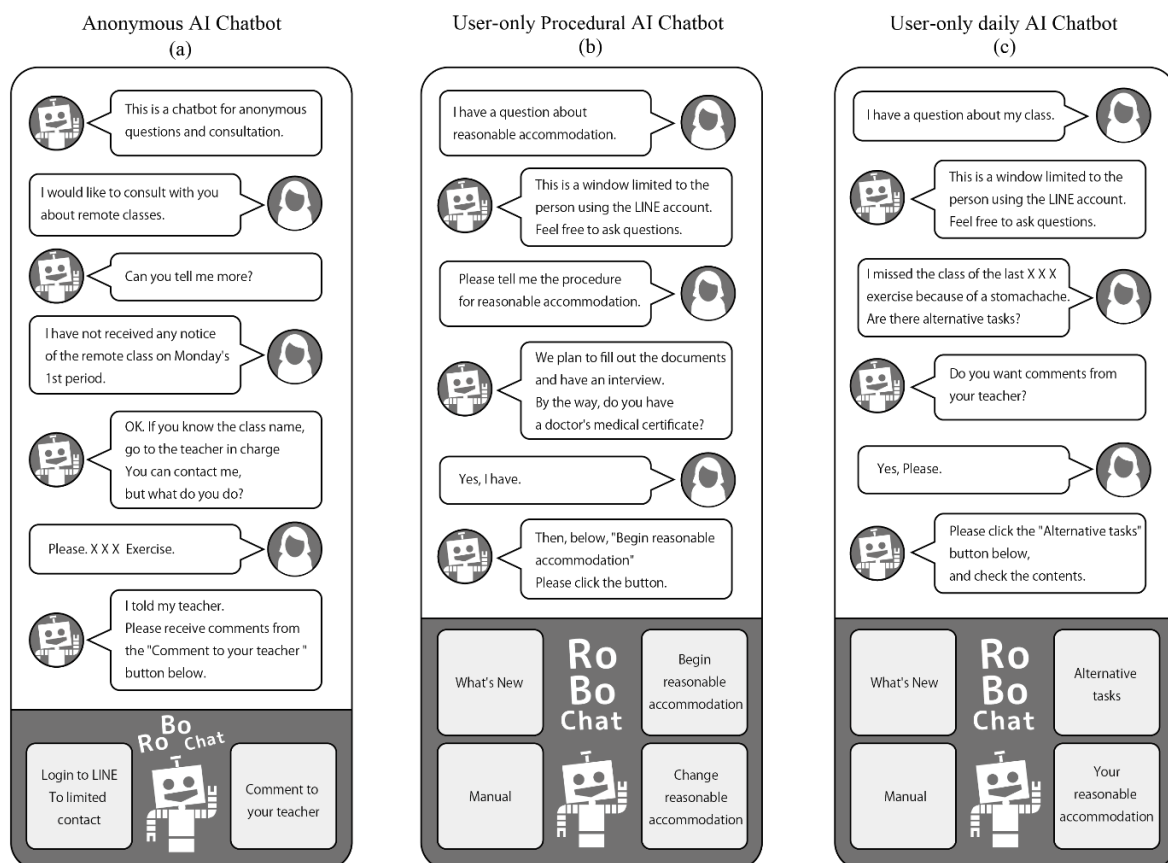

Figure 3: UI design of the chatbot system using SNS.

4. Conclusion

Although this study focuses on students with disabilities, covering all students would help them to avoid dropping out of school or taking a leave of absence. The extent to which AI chatbots can determine whether accommodations are necessary depends on the responses to the chatbot and the content of the scenario, and we believe that the construction of an appropriate and rich database is essential. Therefore, Shikoku University plans to obtain the necessary data from a questionnaire survey of faculty and staff, create a database of the data, and improve it through practical experiments so that it can be used more effectively.

Since February 2020, as part of the measures to prevent the spread of COVID-19, we have been working through a trial-and-error approach to deal with the issue of remote learning. However, as all students not just those who are provided with accommodations have more opportunities to study at home and places other than the university, it has become more difficult for faculty members to understand the current situations of the students. It is therefore necessary to consider the study of relevant ideologies as possible countermeasures for students at risk of suicide and self-harm due to the unprecedented environment and to apply the results of that analysis to this study.

Acknowledgement

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