

CHAT2LEARN

Chatbot technologies for digital entrepreneurship education and adult learners

ToT Handbook

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PREPARED BY



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Introduction

In the "Methodology on how to Incorporate Chatbot Technologies into the Educational Process", we have already looked at the basics of chatbots (what they are, their types, how and where they are used - Part A) as well as how this technology can be used in adult education and what benefits it offers (Part B).

We have already learned that chatbots can act like assistants in education, relieving educators of administrative and organisational tasks and allowing them to focus on the pedagogical side. We have also seen that chatbots can act like co-educators or even sole e-educators, helping instructors and tutors throughout the educational process (learning material delivery, mentoring, assessment and feedback collection, support and encouragement) on one side and at the same time supporting learners on the other.

Some of the good practices we collected display the usage of chatbot technology in different sectors (health, housing, insurance, HR, language learning, 24/7 student assistance etc.). In this section, we will try to focus on the education sector, especially on how to create learning materials and resources for the efficient use of chatbots, since they depend entirely on the information they can access. Therefore, it is important to create resources that allow easy and quick access, as well as intelligent search and retrieval of information.

The purpose of this Handbook is to equip adult educators and training professionals with practical knowledge and hands-on guidance on how to incorporate the new approach into their educational practices, especially in the field of teaching entrepreneurship, how to create learning resources and teaching materials, and how to involve their learners into self-learning activities based on chatbot learning environments.

This ToT Handbook consists of 2 parts:

- ❑ **Part 1.** *General guidelines to adult educators on how to approach and create suitable training content for chatbot learning environment*
- ❑ **Part 2.** *Practical advice to educators and training professionals how to encourage their learners to use chatbot learning materials for improving their entrepreneurial skills and competences*

Part 1 - How to approach and create suitable training content for chatbot learning environment

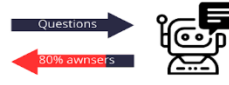
1. What are chatbot technologies mainly used for? Which fields and industries are the chatbots used in?

The use of Chatbot technologies is gaining pace in all industries, including business and finance, health care and education. This is due to the fact that chatbots help companies to save time and money improving customer service at the same time. Here are some interesting statistics on the usage of chatbots:



1.4 billion people
are using chatbots ¹

Chatbots can
answer 80% of
standard questions ²



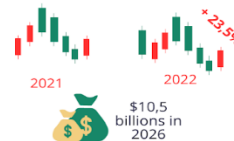
In 2018, more than 67%
of consumers worldwide
used chatbot support ³

64% of consumers
find the ability to get
24-hour service as the
main benefit of
chatbots ⁴



Big companies, such as
LinkedIn, Starbucks,
British Airways and eBay
continue support chatbots
within their business ⁵

It is expected that global
chatbot market will
increase 23.5 %
(compared to 2021) and
will reach \$10.5 billion
by 2026 ⁶



In 2022, 54% of
organisations use a form
of chatbot ⁷

Depending upon their purpose and programming chatbots can perform a variety of tasks. Let's have a look at some of them:

Informative or FAQ-chatbots are programmed to provide quick and accurate answers to frequently asked questions by customers or users. They are designed to provide users with a preliminary determined scope of information, which is available from a fixed source. These bots can be text-based or voice-enabled. (Methodology, p. 12)

Data screening bots help deal with big amounts of data, which are accumulated and collected nowadays, and allow users to easily classify it into different categories and depending on their needs for further analyses.

Such data might be:

- word frequency (which is related to counting occurrences of pre-selected words into a text),
- lexicographical data (which focuses on semantic and relationships of a vocabulary),
- clustered data (which tracks sets of words/numbers/features, and so forth grouped by similar classes),
- descending/ascending hierarchical classifications, etc.

Such bots extract data from different sources (websites, social media, text, image or data banks, etc.) and convert it into readable formats, which are easy for review and comparison.

Amusement or Entertainment chatbots are made for entertaining users or for media purposes. Some examples are TV show guide bot, Quiz bot, cinema bot, News and media bots, podcast bots etc. They can also tell jokes, play games, or engage in conversations.

Customer support chatbots answer questions, resolve issues, and provide assistance with product or service-related inquiries.

Booking and Reservations chatbots assist with making hotel or restaurant reservations and scheduling appointments.

E-commerce chatbots assist with e-commerce transactions, such as helping customers find products, answering questions about products and processing orders.

Social Media Management bots can be used to manage social media accounts by posting updates, responding to comments and answering messages.

Language Translation chatbots help users to communicate in different languages.

Content Delivery chatbots can deliver news updates, weather forecasts and other information based on their preferences and interests.

Educational chatbots allow learners to browse through different courses and learning content offered by educational institutions worldwide. Some may perform as advisors on which course better suits you, some act as a teaching assistant or even as a self-learning tool.

Informative or FAQ-chatbots are designed to provide users with preliminary determined scope of information, which is available from a fixed source. These bots can be text-based or voice-enabled and their goal is to respond correctly to a user's query.

2. What tasks can be performed by educational chatbots?

The focus of our project is chatbots for education, so we will look at the different tasks these types of chatbots are designed for. Educational chatbots can serve for the following purposes:

- **Provide reminders**

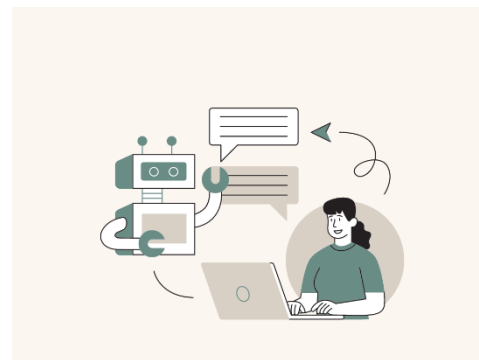
Unlike emails, chatbots that integrate with popular messaging channels can be more effective. They manage to reach the learner at any time anywhere by popping up among their regular conversations. They can be programmed to arrive to the learners when they do need them. These friendly chatbot messages that remind the learner of the main concepts learned help with their better retention and further application.

- **Personalised Learning**

Educational chatbots can provide personalised learning experiences based on individual student needs and preferences. They can adapt to a student's learning style and place, and provide feedback and support to help students progress.

- **Track goals**

If the learner sets meaningful goals to achieve during the course, a chatbot can be designed to act like an accountability partner. It can send regular reminders, ask about



progress, and provide useful resources. According to a study by Dominican University of California⁶ having another person as an accountability partner increases the chances of achieving set goals by 33%.

- **Introduce new concepts**

As educators, we often have limited time to deliver all the valuable content we can teach. In this case, a chatbot can help us by teaching new concepts after the class is over.

- **Assess and evaluate**

Assessment is important to determine if the content is well understood by learners. Chatbot quizzes and tests at the end of a course or seminar can be a good assessment tool. Chatbots can easily provide binary or multiple choice questions as well as solicit feedback in the form of open-ended questions.

- **Continuous Performance Support**

The chatbot can act as a 24/7 coach that can answer learners' questions at any time, helping them to practically apply the knowledge they have acquired at the moment they need it most.

- **Administrative support**

Instead of standing in line at offices, students can resolve any question via chatbot. The chatbot can provide them with details about courses and enrolment, fee structure and other financial aid, news about the institution, information about campus and school events, etc.

- **Homework help**

Chatbots can assist students with homework by answering questions and providing explanations. They can also provide examples and walk students through problem-solving steps.

- **Language Learning**

Chatbots can assist with language learning by providing vocabulary and grammar exercises, practising conversation skills, and providing feedback on pronunciation.

- **Mental Health Support**

Chatbots can provide mental health support by offering resources and advice on managing stress, anxiety and other issues that may affect student well-being.



In our collection of best practices (<https://chat2learn.eu/best-practices>), you can find examples of chatbots in education that perform different tasks. They serve to:

- **Provide reminders:** *Snatch Bot*
- **Track goals:** *Mondly VR, TutorBot, QuizBot, Duolingo, Ms Lindquist, Mr Wilson*
- **Introduce new concepts:** *BOT - Universidad CEU Cardenal Herrera, EconBot, Mondly VR, Snatch Bot, CPIAbot, BOB, TutorBot, QuizBot, Duolingo, Ms Lindquist, Mr Wilson*
- **Assess and evaluate:** *EconBot, Mondly VR, CPIAbot, TutorBot, QuizBot, Duolingo, Ms Lindquist, Mr Wilson*

- **Provide continuous performance support:** *Botter - Enhancing Digital Learning, Mondly VR, TutorBot, QuizBot, Duolingo, Ms Lindquist, Mr Wilson*
- **Administrative tool:** *Blender Bot*
- **Dialoguing with humans:** *BOB*

Overall, educational chatbots can be a valuable tool for students of all ages, providing them with personalised support and resources to enhance their learning experiences.

3. Approaches to building a chatbot

Before starting to build a chatbot from scratch, it's important to remember the two main types of chatbots: **rule-based** and **AI chatbots**.

Rule-based chatbots

These types of chatbots are the simplest solutions used to answer simple questions. The user interacts with them by clicking on ready-made questions that lead to the desired answer. They use a decision-tree flowchart to determine which answer to provide based on the user's input.

An example of a rule-based chatbot: Facebook Messenger - this platform allows companies to offer automated customer support by providing buttons with possible questions and automatically giving an answer.

Key attributes:

- They follow predetermined rules, that's why they are used for simple scenarios;
- Interactions with such chatbots are highly structured;
- Ideal for answering common questions such as queries about timetables, delivery status, tracking details etc.;
- Cannot provide personalised answers as they follow predefined rules;
- Easy to build, but prone to provide wrong answers and quite limited in functionality.



Let's see a more detailed example. Imagine you're building a rule-based chatbot for a pizza restaurant. The purpose of the chatbot is to take orders and answer customer questions. A rule-based scenario for this chatbot might be programmed with the following rules:

- If the user says, "Hi", the chatbot responds with "Hello! Welcome to 'Pizza Palace'. How can I assist you today?"
- If the user says, "I want to order a pizza", the chatbot responds with "Sure, what type of pizza would you like? We have: pepperoni, veggie, margarita and 4 cheese".
- If the user asks, "How much does a pizza cost?" the chatbot responds with "Our pizzas range from 12 to 20 €, depending on the topping and size."
- If the user says, "What are your opening hours?", the chatbot responds "We're open from 11 am to 10 pm every day."
- If the user says, "Thank you", the chatbot answers "You're welcome! Enjoy your pizza."

As you see, the chatbot follows a set of predefined rules and provides responses based on the user's input. It can be useful for simple tasks, answering commonly asked questions (FAQs) and taking orders, but it is not able to handle more complex queries or provide personalised responses that would imitate humans.

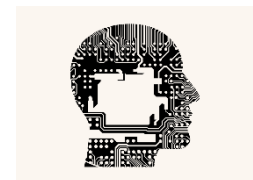
AI-based chatbots

These chatbots, also called conversational chatbots rely on Artificial Intelligence. They combine machine learning and NLP (Natural Language Processing) to understand and process the user's intent and provide a personalised and relevant to the context answer. These bots need training. The more you train them, the more they learn and better interact with the user imitating a real live conversation. These chatbots are more advanced in functionality, as they can form sentences by themselves and provide a much more personalised answer.

Let us see an example of how an AI-based chatbot:

User: *Hi there, what can you do?*

Chatbot: *Hi! I'm an AI-powered chatbot designed to answer your questions and assist you with tasks. How can I help you today?*



User: *Can you recommend a good restaurant in the area?*

Chatbot: *Absolutely! What type of cuisine are you interested in and what's your budget?*

User: *I'm looking for Italian food and I don't want to spend more than 50€.*

Chatbot: *Great! Based on your preferences, I would recommend trying out "Mario's Italian Kitchen". They have a wide selection of delicious Italian dishes and their prices are very reasonable.*

User: *Thanks, that sounds perfect. Can you make a reservation for me?*

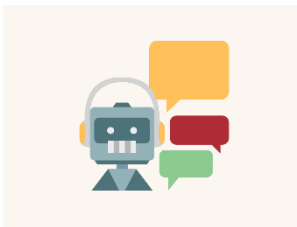
Chatbot: *Of course! What date and time would you like to book a table for, and for how many people?*

User: *Let's do it on Saturday at 7 pm for a party of four.*

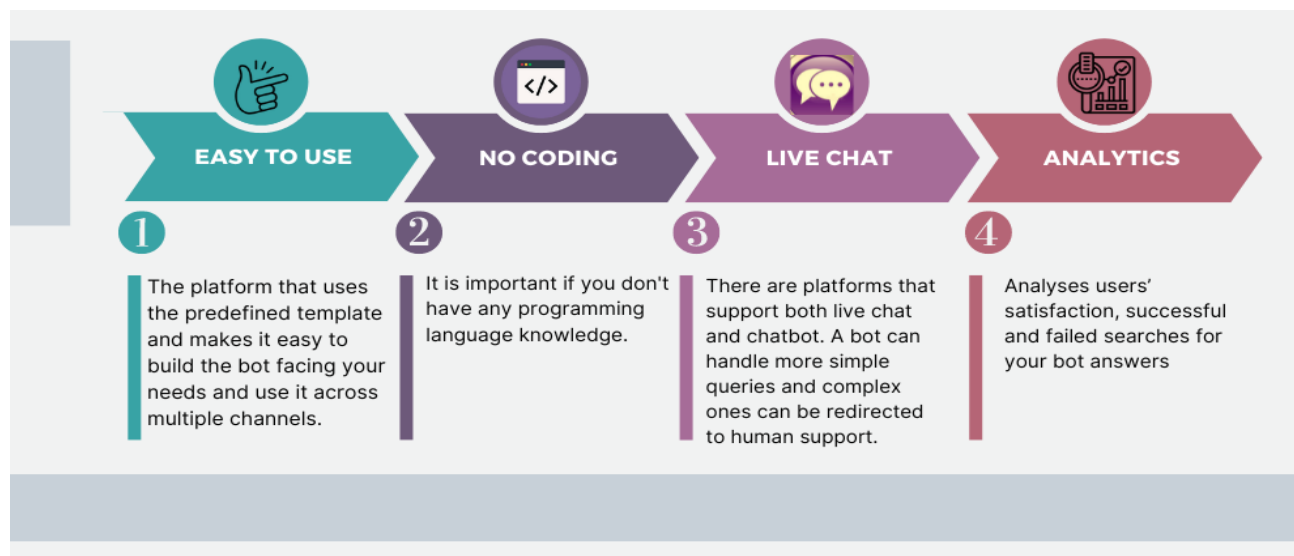
Chatbot: *All right, I've made a reservation for you at Mario's Italian Kitchen on Saturday at 7 pm for a party of four. You're all set! Is there anything else I can help you with?*

As you can see, in this example the chatbot is able to understand the user's request for a restaurant recommendation (this request is not predetermined like in a rule-based), ask follow-up questions to narrow down the user's preferences, and ultimately perform the task making a restaurant reservation based on user's chosen date and time. This chatbot is therefore able to use natural language processing and machine learning to understand and respond to user requests in a conversational way.

4. Chatbot building platforms



There are many chatbot development platforms that require a different level of technical expertise. Some are easy to use, that don't require any specific technical knowledge, and others are more complicated. Once you set the objectives for chatbot use (what task you want it to perform), here are the main criteria to choose a suitable platform:



Here we offer you a table with a list of some chatbot building platforms and their main characteristics:

Name of the platform and a link	Short description with key features	Price	Field it is mostly used in
Chatfuel https://chatfuel.com/	Rule-based; Ready-to-use templates, Robust analytics, Easy to use; Limited to Facebook and Messenger	Free trial for 50 conversations; Different plans available from 15-300 \$ / month	E-commerce (customer support, sales)
Botsify https://botsify.com/	AI-based, No coding; Multiple channels support; Difficult to use	14 days Free trial Standard plan – 50\$ per month,	Business

		Fully managed service – from 300\$ per month	
Flow XO https://flowxo.com/	AI-based Easy to use, Multi-channel support; Pre-built templates; Minimal analytics	Free plan up to 500 interactions	Business
SnatchBot https://snatchbot.me/education	Cloud-based platform allowing users to create and deploy chatbots for a variety of purposes. It is relatively easy to use for users with no coding skills. Ofres: - drag-and-drop interface - pre-built templates (however, some advanced features and customisation options might be more complex) - NLP, interaction with external services, tools for creating polls and surveys; - supports a range of messaging channels (Facebook, Slack, WhatsApp).	Range of plans: -free plan (basic features and limited - messaging volumes); paid plans start at 30 € per month	Businesses of different types
Juji https://juji.io/education-chatbot/	- Customisable - Easy to use - No coding required - Provides you with a real-time dashboard to view and interact with user analytics	Free	Educational
TARS	AI chatbot builder that allows users to create and deploy chatbots for websites and messaging platforms without any	Prices start at 499 \$	Commercial

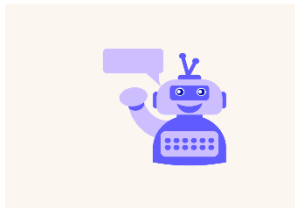
	<p>coding skills. Provides drag-and-drop interface that enables users to create conversational flows and design chatbot appearance.</p> <p>Offers:</p> <ul style="list-style-type: none"> -Natural language processing - integrations with popular platforms like Facebook Messenger; - analytics to track the chatbot's performance. 		
<p>Chatbot.com</p> <p>https://www.chatbot.com/</p>	<p>Chatbot.com is an all-in-one platform for building and launching conversational chatbots without coding.</p> <p>It has 2 objectives related to its educational chatbots:</p> <ul style="list-style-type: none"> • For university templates – to help universities engage and support candidates on their website and social media pages and to streamline the admission process. • For general educational chatbots – to allow education providers to automate their communication and admission process and to quickly recruit and help students 	<p>Free for 14 days 1 month - 65 dollars</p>	<p>Educational</p>

Dialogflow https://cloud.google.com/dialogflow/	A Google-owned chatbot development platform that offers natural language processing and machine learning features. It has a user-friendly interface, offers multi-language support and can integrate with Google Cloud and other third-party applications.	Free trial, monthly charge based on the usage or the number of interactions.	Business
Microsoft Bot Framework https://dev.botframework.com/	A chatbot development platform created by Microsoft that enables developers to build and deploy intelligent bots to a variety of channels	Free Trial. Unlimited messages on standard channels	Business, and e-commerce
IBM Watson Assistant https://www.ibm.com/us-en/	AI-powered chatbot platform that allows businesses to create virtual assistants that can communicate with customers via voice or text. It offers a drag-and-drop interface, natural language processing, and can integrate with other IBM Watson tools.	Free trial for 1 month	Business
ManyChat https://manychat.com/	Primarily focused on creating a rule-based chatbot for Facebook Messenger (also Instagram, WhatsApp and Telegram). although it supports some AI features. It offers drag-and-drop tools, and multiple chatbot templates and supports different languages.	Free trial period. 15 dollars per month for the pro-package.	E-commerce Restaurants Agencies
BotFather https://t.me/BotFather	It is a Telegram bot dedicated to the creation of new bots, necessary for the first steps and general settings, such as the selection of	Free	Multipurpose (Business,

	the name, the username, the description and the commands to be set. Easy to use.		Education etc.)
Landbot https://landbot.io/industry/education-chatbot	Landbot is a user-friendly no-code solution for creating conversational chatbots. It offers a drag-and-drop interface to create a chatbot quickly on the web, WhatsApp, or Messenger.	Landbot.io offers free, paid, and custom plans. The Sandbox plan is free and offers basic features. The paid plans cover Starter plan 30€/mo and Professional plan at 80€/mo.	Business and Education
Wit.ai https://wit.ai/	Wit.ai is a free chatbot software that lets you easily create text or voice-based bots on your preferred messaging platform. Wit.ai learns human language from every interaction and leverages the community: what's learned is shared across developers. You can make bots in 132 languages for social channels, mobile apps, websites, and IoT devices	Wit.ai is a free chatbot platform. You can create a Wit.ai account by logging in via GitHub or Facebook	Mainly for business, it has been used for education and training to detect contexts and concepts.
Appypie https://www.appypie.com/chatbot/education-bot#	Appypie allows you to easily create chatbots for web and applications by choosing from over 10000 models and without needing any notion of coding.	A free trial for 7 days is available. The cost of the Basic version is 6 pounds per bot per month.	Multipurpose (Education, ordering, survey etc.)

Although most platforms provide templates for chatbot development for businesses, you can try them out in your field. Also, your students who want to become entrepreneurs one day might find these platforms useful for their future business development.

5. The basic rules for writing a script for an educational chatbot



Chatbots can be very useful, intelligent, adaptable and responsive, but their effectiveness depends on the information they have access to. Therefore, it is important to pay particular attention to how you design the learning content and resources that chatbots will use. This means creating content that allows quick and easy access, as well as intelligent

search and retrieval of information.

Learning support should also be presented in a way that learners can easily digest. A student searching for a particular piece of content will want to access it quickly rather than work through the entire course to find the necessary information.

Depending upon the platform that you choose to build your chatbot, the requirements may change and you will be provided with some specific guidelines for script development. Rule-based chatbots, however, follow more or less the same pattern. In this section, we take a look at a number of general tips that you should consider when developing material for an educational chatbot:

1. **Identify the topics** that your chatbot will handle: Start by identifying the educational topics that you want to present with the help of the chatbot. These could include subjects like science, history, maths, or language learning. Once you have the subject, think of a subtopic or a specific theme.
2. **Create a list of potential user inputs:** Think of possible user queries that your chatbot might receive from the learner. These could be questions, statements, or commands related to the educational subtopic your chatbot covers.

3. **Define the responses:** For each input, define the responses that your chatbot should provide. The responses should be informative, engaging, and easy to understand. You can also create multiple responses for each input to make your chatbot conversation more varied.



4. **Organise your responses into categories:** Categorised responses will make it easier for your chatbot to choose the appropriate response for each input. For example, you could organise responses into categories such as “basic concepts”, “examples”, or “advanced topics”.
5. **Define the rules:** finally, define the rules that your chatbot should follow to determine which response to provide for each input. These rules could be as simple as “*if the user input contains X, then provide response Y*”, or they could be more complex, taking into account the user’s previous interactions with the chatbot, user preferences, or progress.
6. **Include interactive features:** Educational chatbots can be more effective if they include interactive features such as quizzes, games and simulations. Consider adding these features to your chatbot to make learning more engaging and interactive for users.

7. **Test and iterate:** Test your chatbot with different user inputs and scenarios to try out all the possible pathways and make sure that it is functioning as intended and providing useful responses to the users. Keep refining your chatbot and scripts based on user feedback and behaviour.

By following these general steps, you can create a highly effective educational chatbot that provides a valuable learning experience to users.

6. Guidelines for preparing learning content for Chat2Learn platform.

Description of the platform:

The main goal of the Chatbot Platform is to educate adult learners about various topics in the form of modules and module lessons. To have access to the platform it is required to create an account. There are two ways of registration, as a teacher/educator or as a student. Each registration requires users to select a preferred language. The language that the teachers choose will be the language that they will be adding educational material. Respectively, the educational material that the students will see will only be in the language they chose during registration. Their selected language can change when editing their profiles.

The teachers are responsible not only to add the educational material but also to create it. First, they have to choose a topic, create a module and divide it into three lessons. At the end of every lesson, there is a small assessment quiz and at the end of all the lessons of a module there is a bigger quiz for the entire module. Therefore, the teachers have to create the quizzes too.

Every lesson consists of question blocks and information blocks and each block must have one type. There are four different types:

1. Yes/No – Question block: The student will only be able to answer this question with Yes or No.

2. Informative - Information block: The student will not answer anything and the Chatbot will proceed to the next question/information block automatically.
3. Continue – Information block: Students must press “Continue” after the information block for the Chatbot to proceed with the next one.
4. Multiple Choice – Question block: Students will have to choose between answers. The possible answers can be up to four.

A visual representation of a question/information block in a lesson is shown in Picture 1. How to get there from the platform, meaning how to add modules and module lessons are explained in detail in the [manual](#) [9]. The first box is the code of the question/information block, which is automatically assigned by the programme. In the second box, the teachers add the question/information block text. After that, they have to choose its type from a drop-down list. If the question/information block is:

- Yes/No, the “Possibility 1” box should have the code of the next question/information block if the student selects “Yes” and respectively, the “Possibility 2” box should have the code of the next question/information block if the student selects “No”. The other possibilities are disabled in this case.
- Informative or Continue, only “Possibility 1” is enabled and it should have the code of the next question/information block.
- Multiple Choice, all the possibilities are enabled but not mandatory to complete all of them. This type requires the text of the possible answer as well as the code of the question/information block that the Chatbot will show next if the student presses that specific answer.


Questions	Possibility 1	Possibility 2	Possibility 3	Possibility 4	Type	First Question	Delete
0					Choose...	<input type="radio"/>	

Submit

Add new question

Picture 1

Picture 2 shows the questions of a quiz. How to get there is explained in the manual. It is the same procedure for lesson and module quizzes. The first box shows the question's code and the question text goes on the second box. By clicking the edit button, the teachers can add the possible answers to that specific question as well as a feedback for each answer as shown in Picture 3. The teachers should tick the correct answer. An example of feedback on a correct answer can be "Good Job, this is the correct answer" and on a wrong answer, "Unfortunately you answered incorrectly". Feedback is not mandatory.



Questions	Delete	Answers
0 test 1	Delete Question	Edit
0 test 2	Delete Question	Edit

Submit

Add new row

Picture 2

[Add new answer](#)

You did not chose the the correct answer(s).

Answers	Feedback	Correct response	
0	Answer 1	Feedback 1	<input type="checkbox"/> Remove
0	Answer 2	Feedback 2	<input type="checkbox"/> Remove

[Submit](#)

Picture 3

Guidelines for content creation:

- Creation of a module with three lessons.
- Each lesson must have a small assessment quiz with 5-6 questions.
- Each module must have a quiz that covers all its three lessons with 10-15 questions.
- All three lessons are recommended to have approximately the same number of question/information blocks, around 40-60. The lessons should not be too long hence the chatbot does not save the progress of students unless they finish the entire lesson and the small assessment quiz at the end of each lesson
- The question/information blocks and possible answers should not be too long since the goal is to provide a fun educational experience and not to tire the students. All the educational material has to be written in a clear manner.
- Quiz questions have to be clear and not too long because students will not have the opportunity to ask for clarifications like they can do in physical classes.
- It is important when preparing the lesson question/information blocks and the quiz questions to make sure to 1) include 'single quotes' rather than "double quotes" if you want to include quotes. 2) If the question/information block includes links, insert a space after the end of each link and 3) do not include enters on the possible answers text on multiple choice question blocks.

Regardless of the suggested question/information block and quiz question numbers, it is up to each educator to decide how long their lessons and quizzes are going to be. The numbers are indicative for a more effective student learning.

Part 2: Practical advice to educators and training professionals how to encourage their learners to use chatbot learning materials for improving their entrepreneurial skills and competences

1. General overview of the benefits of using chatbot technologies in education

To be able to encourage somebody to try out and use something, we should be able to enumerate the benefits of it. In this section, we are going to review the main advantages of using chatbot technologies for both educators and students.

Benefits for educators

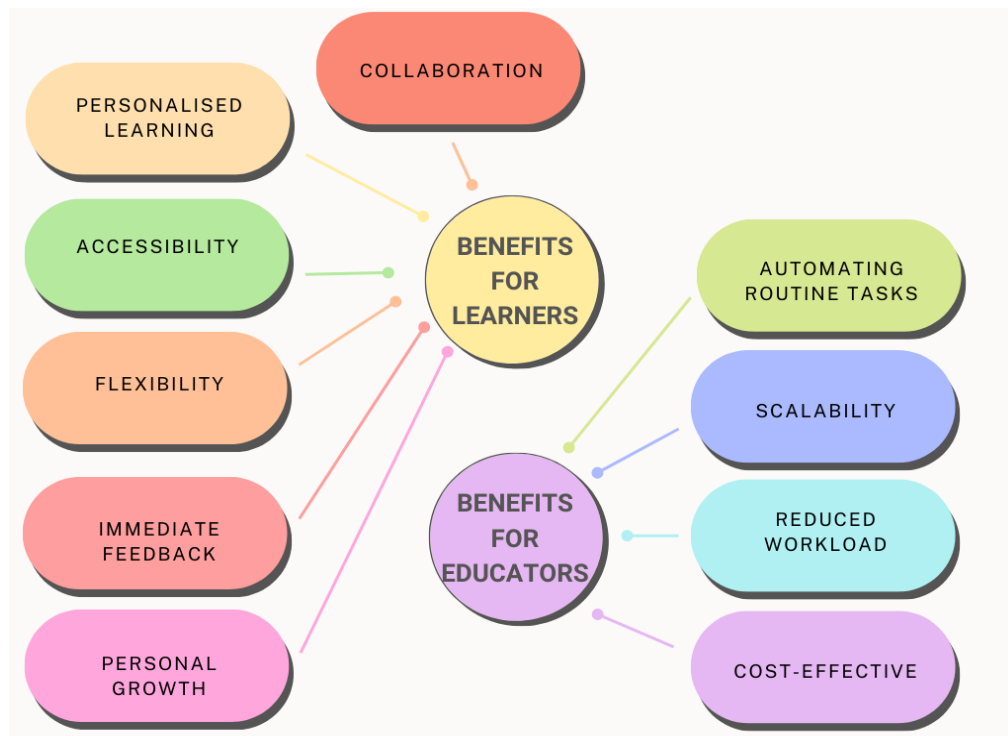
Chatbots have the potential to enhance the teaching and learning experience for both teachers and students, particularly in the area of entrepreneurship education but specifically, these are some of the benefits that **teachers** can experience if they implement a new, modern methodology to better reach their students:

- **Automating Routine Tasks:** Chatbots can automate routine tasks such as answering frequently asked questions and grading assignments, which can save teachers time and energy. This can allow teachers to focus on more complex tasks, such as providing individual feedback and mentoring students.
- **Scalability:** Chatbots can be programmed to handle large volumes of students simultaneously, which makes them a scalable solution for educators. This can be particularly beneficial for schools or programs that are trying to reach a large number of students. Chatbots can offer personalised support to each individual student, even in large classes, which can help educators provide high-quality support to all of their students.
- **Reduced Workload:** Chatbots can help reduce the workload of teachers by automating certain tasks, such as grading assignments and answering common questions. This can

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free up time for teachers to focus on more complex tasks and provide more personalised attention to individual students.

- **Cost-Effective:** Compared to traditional teaching methods, chatbots can be a cost-effective solution for educators. When automating certain aspects of the learning process, educators can save time and resources, while still providing high-quality support to their students. This can be particularly beneficial for schools or programs that are working with limited resources.



Benefits for learners

Chatbot technologies can provide a wide range of benefits to students aspiring to entrepreneurship. From personalised learning experiences to immediate feedback and scalability, chatbots can help students develop the skills and knowledge they need to succeed in the fast-paced world of entrepreneurship. Here are more examples of benefits:

- **Personalised Learning:** Chatbots can analyse data about each individual student, such as their interests, learning style, and pace of learning, to offer tailored advice, resources, and

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guidance. This level of personalization can help students stay engaged and motivated, as they are receiving support that is relevant and specific to their needs. For aspiring entrepreneurs, this can be particularly helpful as they may have unique interests and goals that require specialised support.

- **Accessibility:** Chatbots are accessible from anywhere, at any time, making them a convenient tool for busy students who are running their own businesses or pursuing other ventures. Students can receive support and advice on-the-go, without having to be physically present in a classroom. This level of accessibility allows students to learn at their own pace, on their own schedule, which can be particularly helpful for entrepreneurs who often have to balance multiple responsibilities.
- **Flexibility:** Chatbots can offer a flexible learning experience, allowing students to learn at their own pace and on their own schedule. This can be particularly beneficial for entrepreneurship students who may have irregular schedules due to their business ventures or other commitments. Flexibility can help students balance their education with their other responsibilities more effectively.
- **Immediate Feedback:** Chatbots can provide immediate feedback to students, which allows them to quickly identify areas where they need to improve. This can be particularly helpful for entrepreneurs, who may need to pivot quickly in response to market changes or customer feedback. Immediate feedback can help students stay on track and make progress more quickly, which is crucial in the fast-paced world of entrepreneurship.
- **Personal Growth:** Chatbots can help students develop personal growth and self-awareness providing feedback and guidance on their strengths and weaknesses. This can help students identify areas for improvement and work on developing their skills, which can be valuable for entrepreneurship and personal growth.
- **Collaboration:** Chatbots can facilitate collaboration between students, allowing them to share ideas, insights, and feedback with each other. This can help students develop a better understanding of the industry and learn from each other's experiences.

2. The challenges of using chatbots in the classroom

Despite the benefits of educational chatbots, their usage also implies certain challenges:

▪ Security and data protection

Chatbots as AI representatives are necessarily related to security. Education is very sensitive to security, both physical and information technology and communications. Given that in higher education there is often also development and research work, it is very important that data and

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processes are well protected. On the other hand, all initiatives related to new scientific research and development are tied to the use of AI methods, but still many educational institutions are sceptical and find it difficult to introduce this practice, although they understand its usefulness. On the other hand, for example, smaller educational centres cannot always cover all information security requirements, because they do not have the available resources, personnel, knowledge, etc.

- **Lack of knowledge, skills and resources**

On the other hand, a number of studies show that students in Europe still have unsatisfactory digital skills. In some parts of Europe, teachers also suffer from a lack of technical equipment and products suitable for their purposes, even a lack of technical skills.

Moreover, choosing a chatbot for a specific program, module, even just for testing the functions, requires certain budgets or external funding, which takes time.

- **Assessment of learning process**

The majority of evaluations performed to test the effectiveness of chatbots are based on the ability to fulfil and engage people but are unable to demonstrate progress in learning. For example, it is not possible to assess if the learning outcomes of the learners are dependent on a conscious acquisition of knowledge rather than on a “mechanical” answer to the questions; chatbots are not able to distinguish who answers questions at random from those who read them carefully to learn the concepts/ principles it contains.

- **User attitude**

If learners have negative perceptions of chatbots, they will be hesitant to adopt and use the technology; many cases of mistrust in the use of TEL in general (including chatbots) are reported in the academic literature: it grows with the age of learners, less accustomed to accepting any digital technology in comparison with young people.

- **Programming difficulties**

Many researchers argue that NLP (Natural Language Processing) is not able to understand the content of the dialogue and identify the users’ social and emotional needs during the conversation; this can lead to a progressive loss of interest in the use of chatbots.

- **Supervision and maintenance**

The learner expects the chatbot to provide accurate answers to each question; the information stored in the bot should be stored on a regular basis so that the chatbot can provide current and accurate information on any subject.

- **Content development**

According to the available academic literature, the use of a chatbot achieves the best results as a reinforcement of knowledge learned in other contexts (e.g. a lesson face-to-face) and the worst for learning skills; for this reason teachers should create lessons to strengthen the knowledge already acquired by using tests, examples, case studies, resources etc.

3. How to measure the validity of the chatbot?

When using chatbots in education, one of the indicators is the volume of user activity. This is no different than researching other purpose-built chatbots. Measuring the volume of activity shows an estimate of the number of interactions from the moment a user asks a simple question to the chatbot to the moment a full dialogue takes place. This indicator helps to understand how often it is used and whether the number of learners is growing or decreasing over time.

Chat/conversation duration can also be used as a metric. It allows to estimate the average duration of conversations. This depends on the specific field of study, but this is known in advance by the researcher. The more time spent with the chatbot, the more real time is saved by the "live" teacher.

Non response rate indicator is quite important for training needs, although it is taken as negative. In reality, it measures how many times the educational chatbot fails to answer a question. Such failure may be the result of lack of content that needs to be supplemented and upgraded, or difficulty for the training bot to understand user queries, which should also be taken into account to improve its performance in the future.

Self service rate: this percentage shows the number of users who managed to get the necessary information, for example on a given educational module. It shows whether the chatbot's answers or information were sufficient without having to meet with a lecturer in person afterwards. Calculated based on the percentage of sessions that were successfully completed

by interacting with a bot without being redirected to a live trainer. Thus, the satisfaction of the trainees can be evaluated.

Goal completion rate allows to measure the success rate of an action performed through the educational chatbot. For example, if the learner clicks on a "go to test" button or similar button that requires a click to get all the information from the bot and move to some next level, even filling out a learning form shows how well it has met its objectives.

4. The interaction styles supported by chatbots

Based on the 2 main types of the chatbots (rule-based and AI chatbots), we can distinguish between two most common interaction styles:

1. Simple chatbot interaction with which read simple user questions and only respond if the question asked is compatible with their pre-programming and the question itself is recognizable to the chatbot. In this case, the problems in the conversation occur when users ask a complex question that is incomprehensible to the chatbot, and then the communication breaks down. Although, these chatbots are common, in fact, they are sufficient to answer frequently asked questions by students that usually cover significant percent of user requests; They fail in more advanced scenarios where there are too many variables or too much knowledge to predict what users might need. Here we can divide 3 different sub-groups of simple learning chatbots:

- a. *Bots for welcoming students*: Bearing in mind, that not all students are feeling comfortable initiating a conversation with a chatbot, so the idea of this type is to be more proactive and often this bot is installed on the home-main page or other high-traffic learner's pages to provoke more engagement.
- b. *Bots for navigation*: They are used for easier orientation of learners; where to look for the information they are looking for, help them see the current program, meetings, and new events, help them find important information on the specific site or about the specific educational institution.
- c. *Bots for solution*: Chatbots can also help students submit assignments in the run-up to online exams and help with administrative procedures such as enrolment. For example, educational chatbots for spelling or grammar rules also help students to have more productive work. These chatbots could 'deliver' an exam to students and if the chatbot is a pleasant, friendly figure, the experience of

taking one of these tests is interesting and modern. Some voice-based chatbots are more accessible to older adults and some special-need people.

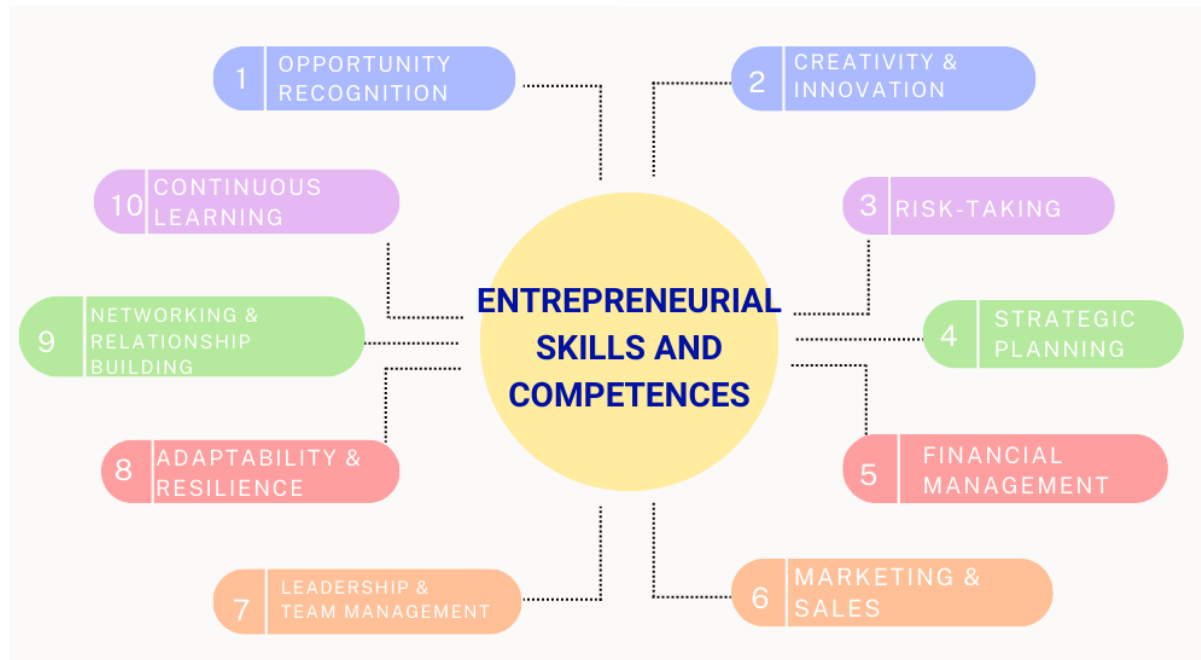
2. Sophisticated chatbots based on user-driven conversations, i.e. chatbots that are powered by AI and thus engage in flexible dialogue. In the most general case, these chatbots are "self-taught" based on the volume of learner-generated questions and can make very good and fast connections for complex questions over time. An AI chatbot assistant with human soft skills serves as a learner's personal learning companion and performs tasks such as:

- introducing relevant programmes/services and guiding prospects to recommended actions (filling out an application) based on the student's inferred interests;
- reading between the lines to identify students' unstated needs or learning styles to deepen student's understanding and retention;
- asking students questions to get their feedback.

5. Definition of entrepreneurial skills and competences

The specific aim of this manual is to improve the entrepreneurial skills of our students. To this end, we should first define what these skills and competences are.

With the right skills and competencies, entrepreneurs are better equipped to identify new business opportunities, develop innovative products or services, manage finances effectively, and create effective marketing and sales strategies:



- **Opportunity recognition:** This skill involves being able to identify new business opportunities and capitalise on them before others do. It requires an understanding of market trends, customer needs and preferences, and the ability to identify gaps in the market that can be exploited. To develop this skill, entrepreneurs need to stay informed about the latest developments in their industry, keep track of emerging technologies, and network with other entrepreneurs to exchange ideas and information.
- **Creativity and innovation:** Successful entrepreneurs are often known for their ability to think outside the box and come up with innovative solutions to problems. This skill involves being able to generate new and original ideas, products, or services that meet the needs and preferences of customers. To develop this skill, entrepreneurs can practise brainstorming techniques, encourage creative thinking among their team members, and stay open to new ideas and approaches.
- **Risk-taking:** Risk-taking is an essential skill for entrepreneurs, as starting and running a business always involves some level of risk. This skill involves being able to assess risks and rewards, and make informed decisions based on that assessment. To develop this skill, entrepreneurs can learn about risk management techniques, seek advice from experienced mentors, and practice making calculated risks in their business ventures.
- **Strategic planning:** Strategic planning is essential for entrepreneurs to develop a clear vision for their business and set goals that will help them achieve that vision. This skill involves setting objectives, developing strategies, and monitoring progress. To develop this skill,

entrepreneurs can create a business plan, seek advice from experienced mentors or coaches, and learn about tools and techniques for strategic planning.

- **Financial management:** Effective financial management is essential for any business to succeed. Entrepreneurs need to be able to manage cash flow, allocate resources, and make sound financial decisions. This skill involves understanding financial statements, forecasting revenues and expenses, and managing debt and equity financing. To develop this skill, entrepreneurs can take courses in finance and accounting, work with experienced financial advisors, and stay informed about industry financial trends and benchmarks.
- **Marketing and sales:** Successful entrepreneurs need to be able to attract and retain customers through effective marketing and sales strategies. This skill involves understanding the needs and preferences of customers, and creating value propositions that meet those needs. To develop this skill, entrepreneurs can take courses in marketing and sales, conduct market research, and test and refine their messaging and marketing campaigns.
- **Leadership and team management:** Entrepreneurs need to be able to lead and manage a team effectively, including delegating tasks, providing feedback, and resolving conflicts. This skill involves developing strong interpersonal skills, and being able to motivate and inspire others. To develop this skill, entrepreneurs can practise effective communication, delegate responsibilities to team members, and seek feedback from team members and mentors.
- **Adaptability and resilience:** Entrepreneurship is a dynamic and constantly changing field. Successful entrepreneurs need to be able to adapt to changing business environments and overcome challenges. This skill involves being able to pivot when necessary, and bounce back from setbacks. To develop this skill, entrepreneurs can practise agility in their decision-making, seek out new opportunities and partnerships, and cultivate a mind-set of perseverance and resilience.
- **Networking and relationship building:** Entrepreneurs need to be able to establish and maintain strong relationships with customers, suppliers, and other stakeholders. This skill involves developing strong interpersonal skills, and being able to communicate effectively with others. To develop this skill, entrepreneurs can attend networking events, participate in industry groups and associations, and seek out mentorship and advice from experienced professionals.
- **Continuous learning:** Entrepreneurs need to be willing to learn and acquire new skills and knowledge to stay up-to-date with industry trends and best practices. This skill involves being open-minded, curious, and always seeking out opportunities to expand their knowledge and expertise. It requires a growth mind-set and a commitment to ongoing self-improvement, as well as a willingness to take risks, experiment, and adapt to changing circumstances. Ultimately, continuous learning is essential for entrepreneurs who want to build successful businesses that can thrive in a rapidly evolving marketplace.

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6. Chatbot technologies fostering entrepreneurial skills

Now that we have defined some of the entrepreneurial skills, let's see how chatbot technologies can foster their development and improvement.

First, chatbot technologies provide students with an interactive and personalised learning experience that encourages critical thinking, creativity, and problem solving. Besides, here some other ways in which chatbot technologies can support the development of the skills previously defined:

- **Opportunity recognition/ Visionary thinking:** Chatbots can be programmed to provide students with insights and knowledge about current trends, emerging technologies, and new opportunities, which can help them to develop a forward-thinking mind-set.
- **Creativity and Innovation:** Chatbots can provide students with personalised prompts and challenges that encourage them to think creatively and come up with new ideas.
- **Leadership and team management:** Chatbots can stimulate real-life scenarios that require students to make decisions and take leadership roles, helping them to develop their decision-making and leadership skills.
- **Financial management:** Chatbots can provide students with information and guidance on how to manage resources effectively, such as time management strategies, financial planning and team management techniques.
- **Adaptability and resilience:** Chatbots can provide students with simulated scenarios that require them to adapt to new circumstances and challenges, helping them to develop their adaptability skills. They can also offer personalised challenges and goals that require resistance and resilience.
- **Networking and relationship building:** chatbots can provide students with opportunities to connect with other teachers, and industry professionals, helping them to build these type of skills. Besides, they also can provide them with feedback on their communication skills and help them to articulate their ideas and thoughts.

Educational chatbots can be programmed with specific information that is much more satisfactory in answering specific questions from learners than traditional search engines, whose results are often overwhelming and too general.

Apart from the entrepreneurial skills, some researches⁸ proved that Chatbot technology exerted a significant and positive influence on explicit reasoning, learning achievement, knowledge retention, and learning interest.

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