3.4 Interactive learning materials

Valerij Dermol, International School for Social and Business Studies, Slovenia
valerij.dermol@mfdps.si

3.4.1 Types of interactivity

Interactive learning materials are interactive resources designed to teach a specific learning outcome.They may comprise a single or multiple pages containing any combination of text, images, audio, or video - including screencasts, animations, self-test questions and other interactive activities. They are usually aimed at self-study and delivered via a learning management system (LMS) but can also be made available online on different platforms.

Interactive learning materials can be provided as supplementary resources or as an integral part of the core activity, e.g. a prerequisite to attending a timetabled seminar because their benefits are becoming commonplace within both learning programmes and several support service websites (Das,2020).

Three types of interaction in the distance learning context are:

1. learner-content interaction
2. learner-instructor interaction
3. learner-learner interaction.

The learner-content interaction happens between a learner and the content for the subject of study. It is considered an intellectual process of interacting with the learning content that changes learners' understanding or cognitive structures in their minds.

The learner-instructor interaction goes on between a learner and an expert who prepared the learning material, such as receiving support from the instructor.

Through group discussion and feedback, learner-learner interaction happens between one learner and other learners, either individually or in groups.

The learner-content interaction will be discussed in this part of the course since the others relate to the communication and collaboration part of the learning content.

3.4.2 Functional or behavioural interactivity

There are two different focuses in discussing learner-content interaction. First, during the late 1980s and 1990s, *functional or behavioural interactivity* was discussed among educators and starting in the 2000s, discussion on *cognitive interactivity* emerged (Das, 2020).

Functional or behavioural interactivity can be classified *as input devices* (e.g., keyboard, mouse, touch screen) or *features provided* in digital media (e.g., hypertext, multimedia). This kind of interactivity is more

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or less an attribute of the medium, focusing less on the dynamic relationship between the learner and the interactive learning system (Das, 2020). Instead, the user performs a physical activity to complete a learning task (e.g., clicking a link or a button or dragging an item).

Three levels of functional or behavioural interactivity can be identified. On a basic level, it typically includes only click interactivities, which simply load the content or navigate through slides. On the Intermediate level, it typically comprises clicks, simple drag-and-drop, and simple text input. Finally, it typically involves clicks, drag-and-drop, text input, simulations, VR/AR, and gaming controls on a complex level (Das, 2020).

3.4.3 Cognitive interactivity

Cognitive interactivity focuses on learners' use of learning strategies to *mentally process the knowledge presented in the interactive learning system*. It is the psychological interaction of the course content with the learner; e.g., the module may ask a question to the learner, which the learner has to answer by thinking. Bloom's taxonomy may also define cognitive interactivities (knowledge, comprehension, application, analysis, synthesis, and evaluation). As in the previous case, three levels of cognitive interactivity can be recognised (Das, 2020).

The basic level includes the first two levels of Bloom's taxonomy, i.e., knowledge and comprehension.This level is more or less based on basic information processing. The intermediate level includes the application and analysis levels of Bloom's taxonomy. This has information application and analytical abilities. Finally, the complex level includes synthesis and evaluation levels of Bloom's taxonomy. Thisincludes problem-solving and decision-making skills (Das, 2020).

3.4.4 Adding interactivity to computer-mediated learning systems

In simple terms, interactivity is any interaction between the learner and the module where the learnergives input, and the module proceeds based on the feedback provided by the learner. Thus, a simple click, drag-and-drop, or text input can be interactive. And simulations, games, Augmented Reality, andVirtual Reality are on the higher end of the interactivity spectrum.

Level 1 interactivity comprises mostly static slides containing text and images and a little graphic designing. In addition, there can be little fade-in/fade-out animations. Sometimes, basic click-to-reveal interactivities are also included. The content covered is mainly information-based, which means that the learner is merely a receiver of the information and usually has limited or no control overthe learning apart from navigation.

To introduce level 1 interactivity, the following functionalities may be added:

– Text and images
– Navigation control
– Links to clicks and reveal

Level 2 interactivity includes everything from level 1 and advanced click-to-reveal and basic drag-and-drop activities. It also includes basic text and image animations. It can also include simple text inputs. Here, the

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learner has more control than level 1 over the learning and becomes more engaged with thecourse content; however, the user is still more or less the receiver of information.

To introduce level 2 interactivity, the following approaches may be added:

- Text and images
- Navigation control
- Buttons and links to click and reveal
- Basic animation
- Basic drag and drop
- Text inputs
- Hot spot

Level 3 interactivity encompasses a wide range of interactivities and content. It includes click-to-reveal,drag-and-drop, text input, hot spot, etc. It also provides character illustrations and animations. Video is also included in this level. Here, the learner is most actively involved in learning and gets to practicewhat is learned, which means that the application of information and analytical abilities are included in learning. To introduce level 3 interactivity, the following approaches may be added:

- Text and images
- Navigation control
- Buttons and links to click and reveal
- Hot spot
- Text input
- Advanced drag and drop
- Advanced animations
- Software simulation

Level 4 interactivity includes advanced simulations, gaming, branching scenarios, and AR/VR-based modules. These are the most advanced level interactivities and content. To introduce level 4 interactivity, the following approaches may be added:

- Text and images
- Navigation control
- Buttons and links to click and reveal
- Hot spot
- Text input
- Advanced drag and drop
- Advanced animations
- Software simulation
- Simulated environment
- AR/VR
- Gaming

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3.4.5 Embedding interactivity into learning

There are a lot of different digital tools that may be used to introduce interactivity in online, self-paced learning. We are going to suggest six tools. They are free and can be easily applied by individualteachers (University of Bristol (n.d.).

H5P

This tool makes it possible (University of Bristol, n.d.) to create, share and reuse a wide range of interactive content such as interactive videos, presentations with interactive slides, branching scenarios to create dilemmas and introduce self-paced learning, interactive books, and many other contents bringing interactivity to online learning such as time-based arithmetic quizzes, personality quizzes, questionnaires to receive feedback, crossword puzzles, drag and drop tasks with images or texts, hotspots for users to find, interactive images, interactive 360 environments, etc. (Examples & downloads, n.d.). The tool can be used to introduce all four levels of interactivity into the e-learning programme. However, it does not support the functionalities of AR/VR, and nether it is not simulation software (H5P, n.d.).

XERTE

Xerte is a browser-based tool suite that allows anyone with a web browser to create interactive learning materials (University of Bristol, n.d.). It offers the production of a wide range of content types such as adaptive content, annotated diagrams, button sequences, decision trees, drag and drop, gap fill, hotspot images, interactive charts, interactive lists, interactive texts, matching texts, model answering, multiple-choice questions, opinion quiz, show graph, sortable grid, stimulating questions, matching pairs, etc. The solution is similar to the H5P tool (Examples & demonstrators., n.d.). The tool can be used to introduce all four levels of interactivity into the e-learning programme. However, it does not support the functionalities of AR/VR, and nether it is not simulation software (Home (XERTE),n.d.)

PowerPoint as an interactive e-learning module

PowerPoint is really powerful and supports the inclusion of interactivity in a presentation. It allows for transforming boring slideshow watching into an interactive and effective process. Besides text, it provides for the inclusion of audio records for each slide, animations, images, video recordings, pop-ups, and navigation among the slides. The best way to transform a PowerPoint file into a clickable presentation is to publish it as a SCORM file and embed the latter into an LMS or website. To do this, iSpring may be used as the authoring tool (Klimenko, 2018). Several other authoring tools, including SCORMHERO, are offered as a free version (unfortunately, with quite limited functionality) and at a relatively reasonable price.

Kahoot!

Kahoot! (Play Kahoot! - Enter Game PIN Here!, n.d.) is an educational platform that is based on gamesand questions. Teachers can create questionnaires, discussions, or surveys that complement academiclessons through this tool. The material is projected in the classroom, and questions are answered by students

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while playing and learning at the same time. Kahoot! promotes game-based learning,increasing student engagement and creating a dynamic, social, and fun educational environment (Chauhan, 2018).

Socrative

Socrative (Home (Socrative), n.d.) is a system that allows teachers to create exercises or educational games that students can solve using mobile devices, such as smartphones, laptops, or tablets. Depending on these, teachers can see the results of the activities and modify the subsequent lessonsto make them more personalised (Chauhan, 2018).

Thinglink

Thinglink (ThingLink: Crea Experiencias Únicas Con Imágenes Interactivas, Videos y Medios de 360 °., n.d.) allows educators to create interactive images with music, sounds, texts, and photographs. Thesecan be shared on other websites or social networks, such as Twitter and Facebook. Thinglink allows teachers to create learning methodologies that awaken students' curiosity through interactive content that can expand their knowledge (Chauhan, 2018).

3.4.6 References and further readings

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