

# INSTRUCTIONAL DESIGN FOR ONLINE CONTENT INTEGRATED LANGUAGE TEACHING WITH A FOCUS ON A RAPID DEVELOPMENT E-AUTHORING TOOL

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## Abstract

Learning remotely is not a new way of teaching and learning. However, its use has intensified due to the Covid-19 pandemic which accelerated adopting instructional design principles to curriculum design and a speedy development of learning materials for many. The design of online modules to be delivered remotely has created many challenges for teachers in all educational fields; this is also true in the context of designing online modules for learning foreign languages in higher education institutions. A number of teachers, an educational technologist and a curriculum specialist got together to address some of the challenges that remote learning brought. The aim was to design a number of online modules adopting a CLIL (Content and Language Integrated Learning) approach to improve the linguistic and socio-cultural competence of university students by using the target language and facilitating student learning remotely.

This paper will examine how instructional design principles were applied to the design and development of learning materials considering the use of a rapid development tool called Articulate Rise 360. The views of tutors involved in the design of modules using Rise 360 will be explored and recommendations will be drawn to provide teachers and designers with how best to design using this tool, either independently or by integrating it in their Virtual Learning Environment.

Keywords: online design, instructional design principles, eAuthoring, foreign languages.

## 1 INTRODUCTION

The Covid-19 pandemic has provided educators with challenges and opportunities to engage in the design of remote learning courses. However, online teaching is not a new phenomenon, and it has been rapidly expanding facilitated by advances in technologies that play a significant role in the design and delivery of online courses [1]. During May 2020, our university took the decision to pause the mobility of students to European countries during the Autumn trimester of 2020-21 and our School was invited to engage in the design of remote modules for students of the Business and Language Programme (BCIT) that could not travel to the host universities in Europe. These students would normally spend the third year of their academic programmes at a host university in Europe. Instead, they would be learning remotely for one trimester and new modules were required.

A team of designers and academic leaders under the direction of an educational technologist and a pedagogical expert began a process of designing four modules to the value of 20 ECTS each for students of French, Italian, German and Spanish. A thematic content and language integrated learning (CLIL) approach, based on cultural and current affairs topics, was adopted to inform the design and delivery of those modules. The focus underpinning the instructional materials was the Learner Experience (LX) Design approach in order to create “learning experiences that enable the learner to achieve the desired learning outcomes” [2]. The modules entailed learning synchronously with live Virtual Classroom sessions within the academic scheduled timetable and the design of asynchronous, autonomous learning materials that the students engage with outside the live Virtual Classroom sessions. The aim was to improve the linguistic and socio-cultural competence of the students using the target language. Regular virtual meetings took place during the summer of 2020 to ensure that the modules would be ready for the academic year starting in September.

This paper will examine how instructional design principles were applied to the design and development of the learning materials, considering the use of a rapid development tool called Articulate Rise 360. It will also provide recommendations for teachers and designers based on the views of the tutors involved in the design and delivery of the modules.

## 1.1 Teaching languages through content

Language is frequently perceived as a social practice and, in this regard, *The Common European Framework of Reference Companion Volume* (CEFR-CV) describes the learner “as a social agent, acting in the social world”. This implies “recognising the social nature of language and language use, the interaction between the social and the individual in the process of learning”. It also involves an “extensive use of the target language... encouraging them to see similarities and regularities as well as differences between languages and cultures” (p.27) [3]. Motivated by the above rationale, content became the cornerstone of the proposed modules and a Content and Language Integrated Learning (CLIL) approach during the process of designing and delivering the learning materials of these modules was adopted.

In its most generic use, CLIL refers to an educational approach in which “a foreign language is used as a tool in the learning of a non-language subject in which both language and the subject have a joint role” (p. 58) [4]. A typical example would be to learn mathematics through English in a Spanish speaking context. However, CLIL is often referred to as an ‘umbrella’ term because it includes many varieties of practices according to the context in which it is implemented [5]. We have adopted a flexible understanding of CLIL where the two main pillars were the role of content in developing socio-cultural competence and the use of the target language for teaching and learning purposes. Considering that these modules aim to prepare students for their study abroad period, Lasagabaster [6] argues that the CLIL approach prepares them for internationalisation by enhancing their intercultural communicative competence. Furthermore, he adds that CLIL also contributes to boosting their affective dimension because it increases their motivation to learn foreign languages.

## 1.2 ADDIE as an Instructional Design Process for the project

When approaching the design of the new modules, it has been debated what type of processes to use so that we arrive at a satisfactory outcome within a limited time frame. This is when different models were analysed in order to choose the best suited to our needs. We needed an approach which would be pragmatic and drive the design from the beginning to the end and having reviewed a number of models including rapid prototyping approach, Successive Approximation Model (SAM) and ADDIE, the last one was chosen as a driver in the project [7]. The main rationale behind the choice was that it is a streamlined, practical approach that is easy to understand and follow.

ADDIE as a process, dates back to 1970s and US army training methods, however, with the passage of time it was adopted by Instructional Designers as a tool helping with curriculum design. ADDIE stands for Analysis, Design, Development, Implementation and Evaluation, and in each of these stages there are certain steps to take in order to make any curriculum design or redesign effective. When applied to teaching languages online, Russel and Murphy-Judy [1] state that, ADDIE makes the design processes streamlined, structured and pedagogically grounded. It can be applied to the curriculum design (programme or a module level) or a multimedia resource. In the context of the project, it was applied both to the module design as well as multimedia learning materials, emphasising a student-centred approach [8]. Even though ADDIE has been criticized for being a linear approach, namely all A-D-D-I-E steps follow one another, and evaluation is only at the end of the process [9], it was envisaged from the start that the design will have a reiterative manner, with the final evaluation feeding into the future design of the modules. Furthermore, our institution recommends the adoption of the ADDIE model when designing for online learning [10].

### 1.2.1 Our project and ADDIE

At the analysis stage of our project, we carried out an analysis of requirements for our online language modules, staffing and resources as well as students’ needs. At the design stage, we started with the learning outcomes for all the modules, and then considered content and assessment including feedback. The focus was on high quality, authentic and up-to-date content to ensure an effective and motivating learning experience within the modules. At this stage we were also looking at universal design principles and aimed at providing learners with multiple means of representation of learning materials including text, audio and video materials. Development meant for the project a choice of the tool which was Rise 360, an authoring tool widely used for content development. The learning materials were first developed and reviewed (with some technical tests) in a draft version, before being published for the students in the virtual learning environment of the modules. The next step was the implementation which meant bringing the module to the Virtual Learning Environment (VLE) called Brightspace. The module needed to be set up in the online space to follow the principles of Universal Design for Learning so that both

content and assessment with feedback would be fully accessible to all learners [11]. At the end each stage, the project leads were assessing its progress, however the full evaluation was performed both with students and instructors of each module to shed some light on how the modules can be redesigned in the future. This stage was really valuable in the whole design process and provided the project leads with insightful comments that later fed into the analysis of the next ADDIE cycle.

### 1.3 Underpinnings for multimedia design and development

In the design phase we were focusing both on the curriculum as a whole, as well as the learning materials which were supposed to be accessible as well as pedagogically grounded. We wanted to avoid content or technology driven approaches and, as Gagne suggests, utilise authentic materials in line with the learning objectives for all modules [12]. There is already a plethora of resources online that can be mapped to any module or course, however the key was to align these properly to our learning outcomes and to ensure the transfer of knowledge with progression of language skills and competencies happening concurrently. In our design we also wanted to represent our content in multiple ways as per Universal Design for Learning [11] and use both written (texts, graphs, infographics etc.) and audio-visual (mp4s, videos) resources to build our learning materials. Furthermore, the videos we used also had subtitles embedded within them, and the Virtual Learning Environment (VLE) allows to customise its look and feel to suit individual needs.

When designing, we wanted to ensure that learners would maximise their learning in the online space. Online resources were used to serve as a substitute for receptive language skills and to provide content. We adopted Gagne's theory [12] of nine events of instruction as it was found to be appropriate for online delivery of our modules [13]. The theory has been widely used for designing both face-to-face and online resources and has been used in instructional design being seen as an effective one. These nine events start with gaining attention, moving on to stating objectives, recalling prior learning, presenting stimulus, providing learning guidance, eliciting performance, providing feedback, assessing performance and finally enhancing retention.

*Gaining attention* in our resources was designed by placing rhetorical questions, quotes, high quality thought-provoking images or short videos at the beginning of the resources. "Fig. 1" below shows a screenshot from one of the learning materials in French in which a quote was used to hook the students at the beginning of their learning journey.



Figure 1. Visualization of an image and a quote that serves the purpose of gaining students' attention.

*Learning objectives* in the modules were always at the forefront of the resources and broken down from holistic module learning outcomes to weekly objectives linked to each of the resources. These would always proceed *recalling prior knowledge* i.e. asking quiz like questions about previous sessions, asking open ended and reflective questions. These can take the form of multiple choice or multi select questions, drag and drop or gap filling. Each of these was constructed so that there was meaningful feedback for students prompting them to carry on with their learning. *Presenting a stimulus* and providing guidance was reflected in the receptive skills practice and before reading, listening or watching students were motivated by some stimulating questions. If the skill in focus was reading, to avoid cognitive overload, texts were chunked into smaller sections as shown in "Fig. 2".

## So schmeckt Deutschland

Wie erleben in Deutschland lebende Ausländer die deutsche Küche?  
Lest den Text und notiert Vokabeln, die ihr nicht kennt.

“Unglaublich, was man alles aus Kartoffeln machen kann! Von zu Hause kannte ich Pommes frites und Püree, aber Puffer, Kroketten, Gratins, Salate und Suppen aus Kartoffeln habe ich erst in Bremen kennengelernt. Mein deutscher Nachbar hat mir kürzlich ein Kartoffelkochbuch geschenkt, ein paar Rezepte habe ich schon ausprobiert. Ich koche praktisch täglich, meistens ein Reisgericht mit Fisch, so wie es in meiner Heimat üblich ist. Alle Zutaten kann ich in meinem Viertel kaufen – zu unschlagbaren Preisen: Wofür ich hier einen Euro zahle, kostet in Gambia locker fünf Euro. Was ich liebe, ist die großartige Auswahl an deutschen Käsetheken. Verblüffend finde ich die Tischsitten: Pizza, zum Beispiel, essen viele mit den Fingern, sogar bei offiziellen Anlässen. Wo ich herkomme, würde man immer zu Messer und Gabel greifen.”

- Dr. Adam Ceesay (33) ist Internationale Klimaschutzstipendiatin am Leibniz-Zentrum für Marine Tropenforschung in Bremen.

Fig. 2 Reading text divided into digestible chunks for reading comprehension in German.

Eliciting performance and providing feedback was done by utilising some quiz like questions within the tool. “Fig. 3” below shows one which is a drag and drop activity that students needed to do, submit and receive feedback on how well they managed it. These mini activities aimed at retaining interest and motivation while learning too.

Welche Gerichte sind süß und welche herzhaft? Ordnet zu!

☰ Roulade	süß
☰ Leberkäse	herzhaft
☰ Kartoffelpuffer	herzhaft
☰ Pfannkuchen/Eierkuchen	süß & herzhaft

SUBMIT

Fig.3 Drag and drop activity that enables to elicit performance and provide feedback to students.

Student performance was also assessed in a summative way as often after the resource was completed there were short interactive quizzes with feedback provided. Some of the resources were also designed with short reflective questions that aimed at triggering further thinking and *improving retention* too.

## **1.4 Articulate Rise as a chosen tool for the development of CLIL materials**

In recent years there has been an increase in the provision of remote learning offerings and with Covid-19 situation higher education institutions have started to adopt more and more teaching and learning methods and tools used in corporate settings. These tools, called authoring tools, allow us to move beyond traditional PowerPoint slides with audio and enable the use of interactivities, quizzing and multimedia in a single package. Until recent years the main authoring tools were Articulate Storyline 1 and 2, Captivate and Lectora. These were desktop-based applications requiring high specifications of devices in use. However, in 2016 Articulate introduced a ground-breaking package called Articulate 360 with a browser based, annually licensed tool called Rise 360. Rise 360 is a rapid authoring tool enabling to develop learning materials faster, without the need for downloading software (light on the device used), available regardless of the operating systems and easy to use by novices. As opposed to other authoring tools its interface has simple building blocks (drag and drop format), many prompts, different ways to show and chunked texts, interactive components, quizzing, multimedia and even scenario-based blocks. Rise moves from the concept of “slides” and screens, typical to PowerPoint, to building a mini website for students. Learning does not happen in Rise in a linear way, but the material unveils itself in a vertical way, taking into account recent studies on how people read and track information online and how they process written and visual content [14]. Rise produces mobile responsive materials needed for mobile learning, while still having the features of an authoring tool such as publishing to SCORM 1.2 for the Virtual Learning Environments. Its choice as a tool for development of materials in this project was based on these features, accessibility, review facilities and the ease of use. The tool choice was adding the extra visual value to the learning experience [15] of our students due to its interface which was aiming to support their learning by triggering associations and interest.

## **2 METHODOLOGY**

Having described in the previous section how the ADDIE model was adopted for our project, the evaluation phase of the model was undertaken using a qualitative research design. The participants were the four module designers and the four instructors (some designers were also instructors) that taught the modules during the Autumn Trimester of 2020-21. Semi structured interviews, conducted by the educational technologist and the pedagogical expert responsible for the project, were used as data collection instruments to ascertain the experiences of the designers and instructors. The interviews were recorded using Zoom and the data were analysed using a thematic approach [16].

## **3 RESULTS**

All the designers, except one, opted for the use of Rise 360 as a tool to facilitate students with their self-directed learning prior and after the online classes. The designer who chose not to use Rise 360 did so as she felt that the number of learners registered for her module was quite small, not meriting the effort to learn a new tool. She decided to employ other tools she was familiar with. Rise 360 was the anchor of the design as it provided the learning materials that students had to work with prior to synchronous classes. The success of the synchronous classes depended on the quality of the materials, the instructions and activities provided in the resources as well as how the materials were linked to the classes. All the designers that adopted Rise 360 stated that the initial stages in the design process were hard as it took them a while to master the use of the tool. Technological and pedagogical issues were explored with the designers and instructors to get an insight into their experiences. The experiences of the designers and instructors relate to the following topics:

### **3.1 Sequence and navigation**

Following Gagne’s model for instructional design, a lot of effort was given to the sequence of the materials starting with an icebreaker or a hook, followed by an introduction to the multimedia materials (texts and videos) selected. The multimedia texts and videos were followed by a number of learning activities that provided students with the appropriate scaffolding to prepare for the synchronous online class that took place once a week.

All designers said that a lot of upfront thinking was required to get the design right and make it easy to navigate. All the instructors were quite happy with the design sequence. However, one of them mentioned that more variety in relation to the icebreakers would have been more interesting for the students. Another instructor commented that the questions provided to the students to link the materials with the synchronous class were too specific and some students learned the answers by heart rather

than using the ideas to participate freely in the class. One of the instructors said that she should have considered more what students had to do by themselves, what they needed for the class and what they had to do after the class: the before, during and after class. In a similar vein, another instructor commented that more focus could have been given to the pre-reading or pre-watching activities to stimulate the interest of the students.

### **3.2 Materials**

The topics selected for the modules were similar in all languages. They focused on cultural and current affairs of the countries where the students would travel for their time abroad. One designer explained that diversity of sources, from at least two different perspectives informed the choice of materials. Another designer emphasised the importance of multimedia in selecting materials from a variety of media to consider students' learning styles and an increased focus on visual learning. This is in line with universal design principles for learning, to provide multiple means of representation [11].

Another instructor mentioned that some of the quizzes could have been more challenging for the students. In relation to the quantity of materials provided in Rise 360, most instructors were happy, and they thought that it was in line with the workload expected for a 20 ECTS module. One instructor, however, said that, in hindsight, more learning materials would have been useful as students were asking for more. In that regard, several podcasts were added for students to use as further resources.

### **3.3 Student engagement with materials**

All instructors reported a high level of engagement with the learning materials by the students in preparation for the synchronous classes. However, one of the instructors acknowledged that most students seemed to engage with the materials on the same day of the synchronous class, some just a couple of hours before the class, instead of spacing their study throughout the week. One instructor explained that the materials and the preparatory activities worked well and contributed to lively debates and other learning activities during the synchronous class debates. Another one added that students were eager to use during the synchronous class what they had learned during the self-directed work prior to the class.

### **3.4 Content and language**

The integration of language and content was perceived by all the instructors and designers as a more innovative way of teaching language. They acknowledged that this approach facilitated the development of productive skills, mainly speaking. All tutors ensure that reflection on language, particularly on areas where students were making mistakes, was integrated in the classes and raised with individual students.

Reflection was perceived as a better way to address language issues as the focus was on language use rather than on providing a full explanation about a particular language feature without its context. However, one instructor said that this method may have been perceived by the students as if the grammatical issues had not been planned. One instructor noted that further integration of content and grammar exercises would have been needed as students expected it. This may be related to previous learning experiences of the students or to a genuine need to address a number of grammatical issues that still present some problems to the students. The instructor added that when designing the module, such linguistic exercises can be planned and used only if they are needed. It is important to note that the VLE allows to hide content that can be made available to the learners as needed.

### **3.5 Sustainable assessment**

All the designers and instructors explained that they chose assessment strategies that had a "real world" application in the sense of making students demonstrate skills that they would have to use after completing their degrees. Furthermore, the assessment allowed students to be very creative as they could create their own products or artefacts. The assessment strategies included oral presentations, debates, podcasts, blogs, interviews, discussion fora, quizzes or reflection on their learning. The assessment activities include listening, reading, writing, speaking and online interaction. One instructor commented that some of the strategies were quite new for the students and they were intrigued, but they were very happy with the strategies selected. All the instructors were very happy with the assessment strategies and the only issue raised by one of them was to ensure that the written work was not excessive so that appropriate feedback could be given to the students.

### 3.6 Provision of feedback

All the instructors provided students with automated feedback, as well as using group or personal feedback, either in written or oral form. Criteria were provided in advance so that students knew what was required of them. The use of rubrics was perceived by the instructors as a good way of providing feedback. However, there were a number of issues that the instructors raised about feedback practices that indicate that some improvements are needed for future iterations of the modules.

One instructor commented that not enough attention was given to the student writing pieces, implying that a change was needed to deal with feedback and feed-forward to ensure that students apply comments received to their future written assignments. On the other hand, one instructor commented that she provided students with too much feedback and she noted that weaker students, in particular, were not able to engage with it. However, another instructor said that the more feedback students got the more they wanted. Some instructors perceived that students may not have paid enough attention to the feedback if a feedforward component was not incorporated. One instructor suggested including a template asking students to indicate what they need to work on and then to indicate how they had worked on it. It was noted that some instructors still relied on feedback practices that were conducive to face to face teaching, particularly in relation to written work. For example, they downloaded documents and used pen and paper to correct students' work, adding the extra task of scanning and uploading the documents with feedback for the students to see. Peer review and feedback were used, but only by some instructors.

## 4 CONCLUSIONS

The design and development of the modules was guided by the ADDIE Instructional Design process which proved to be successful for our context. The linear character of the process with evaluation of each stage and steady progression helped to streamline designers and developers of the modules and its learning materials.

Rise 360 as a tool met the expectations of the project stakeholders and was found to be a useful and innovative tool. It was used well for receptive skills, combining multimedia and text into unified learning chunks. Its simple interface makes it a tool that can be easily adopted by designers and developers. However, there is a danger of using the tool without considering all the steps that are required for the proper design of the modules as going back to the design is not possible once the teaching begins. Furthermore, it is a license-based product which might impact the adoption rate in higher education.

One of the successes of these modules was that materials were interesting and motivated students to engage with them. This illustrates the importance of doing an in-depth needs analysis and considering all learners, regardless of their abilities. The positive comments from the instructors about the materials indicate the importance of using multimedia and ensure that the sequence of materials as well as the learning activities are well designed.

The design of the modules with asynchronous learning materials as a unified learning path can impact the engagement in a positive way. In the flow of the online modules what is crucial is that both synchronous and asynchronous materials have to be predefined as otherwise students' learning experience might be negative resulting in confusion and lack of engagement.

This study shows that all the instructors embraced feedback and assessment strategies by using the support tools provided by the VLE. The use of rubrics was quite successful in providing feedback to students although it was not always linked to the grading system provided by the VLE. It has been acknowledged by the designers and instructors that thinking about feedback practices could be enhanced by ensuring that it plays a significant role in the design process.

All instructors said that the feedback provided by the students at the end of the module was extremely positive. Most students commented that they enjoyed the module a lot and that this module was one of the most interesting one they had ever taken.

We are very conscious that this study has a number of limitations. First of all, we acknowledge that there was a very small number of designers, instructors and students involved in order to draw generalised conclusions. However, our intention is not to generalise the finding but to provide guidelines for other designers about what work and what doesn't in relation to the design of online modules so that those guidelines can be used in different contexts for the design of any online module. We also have data from a student survey, and it is our intention to analyse these data in the future, first of all to document the

students' experiences of learning remotely and also to compare and contrast their views with those of the instructors.

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## REFERENCES

- [1] V. Russell, and K. Murphy-Judy, *Teaching Language Online: A Guide for Designing, Developing, and Delivering Online, Blended, and Flipped Language Courses*. New York: Routledge, 2020.
- [2] Instructional Design Central, *History of instructional design*, Accessed 20 April, 2021. Retrieved from <https://www.instructionaldesigncentral.com/instructional-design-history>
- [3] Council of Europe, *Common European Framework of Reference for Languages: Learning, Teaching, Assessment. Companion Volume with New Descriptors*, 2018. Retrieved from <https://rm.coe.int/cefr-companion-volume-with-new-descriptors-2018/1680787989>
- [4] D. Marsh, (ed.), *CLIL/EMILE - The European Dimension: Actions, Trends and Foresight Potential Public Services Contract DG EAC*. European Commission, 2002.
- [5] C. Dalton-Puffer, T. Nikula, and U. Smit, "Charting policies, premises and research on content and language integrated learning," in *Language Use and Language Learning in CLIL Classrooms* (C. Dalton-Puffer, T. Nikula, and U. Smit, eds.), pp. 1-22, Amsterdam: Johns and Benjamins, 2010.
- [6] D. Lasagabaster, "Foreign language competence in content and language integrated courses," *The Open Applied Linguistics Journal*, vol.1, pp. 30-41, 2008.
- [7] Allen Interactions, *Resources*, Accessed 10 May, 2021. Retrieved from <https://www.alleninteractions.com/resources/read-watch>
- [8] C. Peterson, "Bringing ADDIE to Life: Instructional Design at Its Best," *Journal of Educational Multimedia and Hypermedia*, vol. 12, no. 3, pp. 227-241, 2003. Retrieved from <https://www.learntechlib.org/primary/p/2074/deline>
- [9] L-L. Chen, "A model for effective online instructional design," *Learning Information and Computer Education Journal (LICEJ)*, vol. 6, no. 2, pp. 2303-2308, 2016.
- [10] UCD Teaching and Learning, *Blended and online learning design*, Accessed 15 April, 2021. Retrieved from <https://www.ucd.ie/teaching/resources/technologyenhancedlearning/blendedandonlinelearningdesign/>
- [11] UDLL Partnership, *Universal Design for Learning - A Best Practice Guideline*, AHEAD Educational Press, Ireland, 2017. Retrieved from <https://ahead.ie/userfiles/files/shop/free/UDLL%20Online.pdf>
- [12] R. M. Gagne, L. J. Briggs, and W. W. Wager, *Principles of Instructional Design*. Fort Worth: Harcourt Brace College Publishers, 1992.
- [13] P. Hannon, K. Umble, L. Alexander, D. Francisco, A. Steckler, G. Tudor, and V. Upshaw, "Gagne's and Laurillard's Models of Instruction Applied to Distance Education: A theoretically driven evaluation of an online curriculum in public health," *The International Review of Research in Open and Distributed Learning*, vol. 3, no. 2, pp. 1-16, 2002, doi.org/10.19173/irrodl.v3i2.105
- [14] K. Moran, Nielsen Norman Group, *How people read online: New and old findings*, 2020. Retrieved from <https://www.nngroup.com/articles/how-people-read-online/>
- [15] EDUCAUSE. (2020). *2020 EDUCAUSE Horizon Report: Teaching and learning edition*. Retrieved from <https://library.educause.edu/resources/2020/3/2020-educause-horizon-report-teaching-and-learning-edition>
- [16] V. Braun and V. Clarke, "Using thematic analysis in psychology," *Qualitative Research in Psychology*, vol. 3, no. 2, pp. 77-101, 2006, doi: 10.1191/1478088706qp063oa