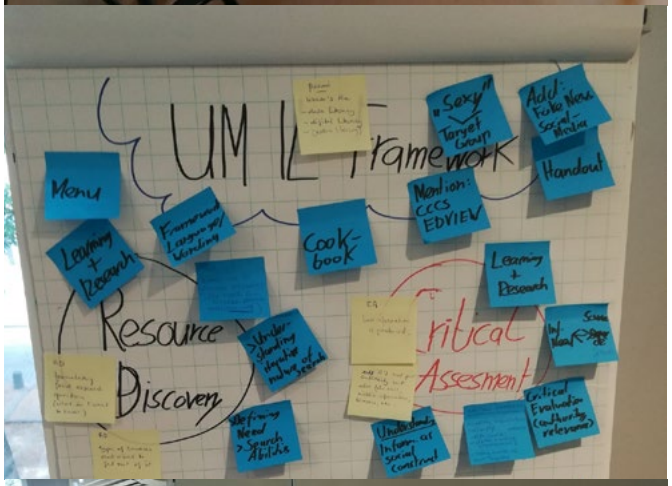
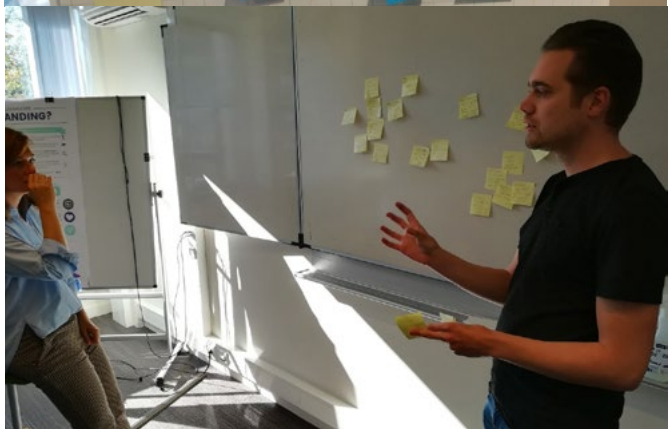
Information-Wise

Maastricht University

Information-Wise: A case for developing an evidence-informed information literacy programme at Maastricht University

Authors Jaro Pichel (UB/EDLAB)
Co-authors Stefan Jongen (FSE/EDLAB), Julie de Ronde (EDLAB), Henrietta Hazen (UB), Barend Last (UB), Alicja Garbaciak (Student)





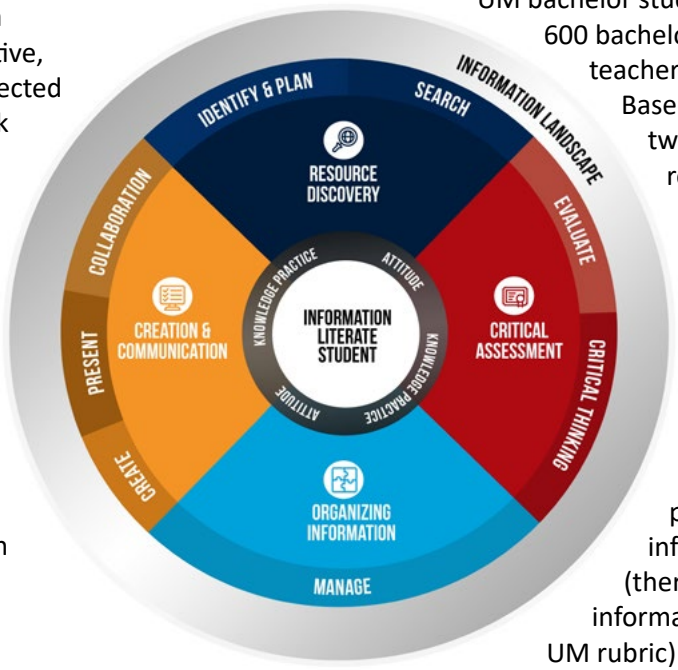
Contents

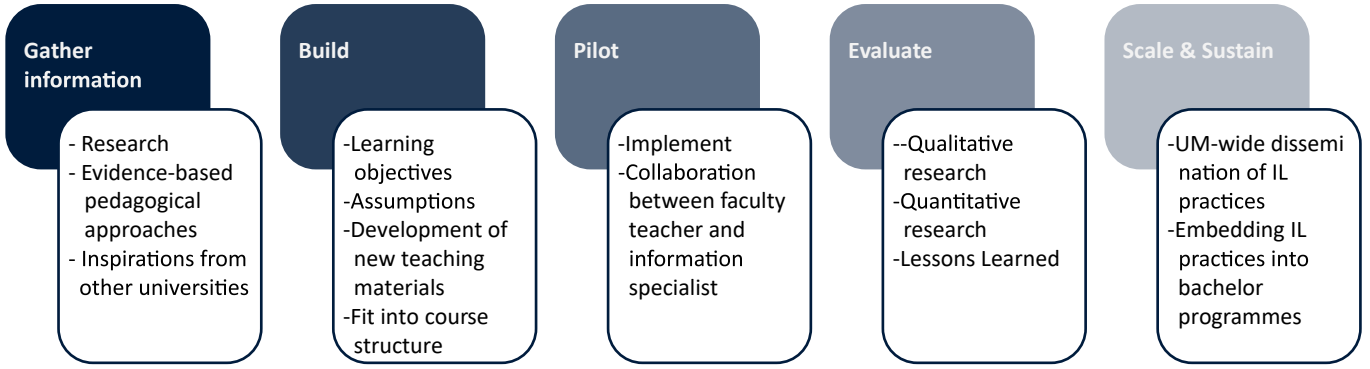
Management Summary

This report presents the theoretical foundation, goals, and deliverables of the Information-Wise project. In this project, the library, EDLAB, and all six faculties collaborated to design an evidence-informed program for information literacy education. The programme consists of educational materials for information literacy skills that can be integrated into existing curricula.

UM Information Literacy framework

The project group developed a framework that represents the UM vision for information literacy education. In line with the EDview recommendations, the framework embraces the PBL principles: learning as a constructive, collaborative, contextual, and self-directed process. The framework incorporated content from prominent information literacy frameworks (i.e. ACRL, Cambridge, SCONUL) and includes four dimensions: 1. Resource discovery, 2. Critical Assessment, 3. Organizing Information, 4. Creation & Communication (see chapter 1).





Information-Wise pilot process

Research

The research phase of this project informed the design and development of the information literacy programme with qualitative and quantitative evidence. Two literature reviews on the changing information landscape, and analyzing informed learning, resulted in recommendations for information literacy education at UM. As such, the project team sent a survey to all UM bachelor students and faculty teachers. Over 600 bachelor students and about 100 faculty teachers responded.

Based on the survey findings and the two literature reviews, one general recommendation and eight specific recommendations are presented in chapter 2.

Information Literacy Programme

Chapter 3 presents the information literacy programme and project pilots. This programme consists of the UM information literacy framework (thereafter UM framework), UM information literacy rubric (thereafter UM rubric) including intended learning outcomes (ILOs) as well as an online curriculum with generic and domain-specific modules. The structure of the programme is flexible and each part should be adapted to the specific requirements and needs of each faculty programme.

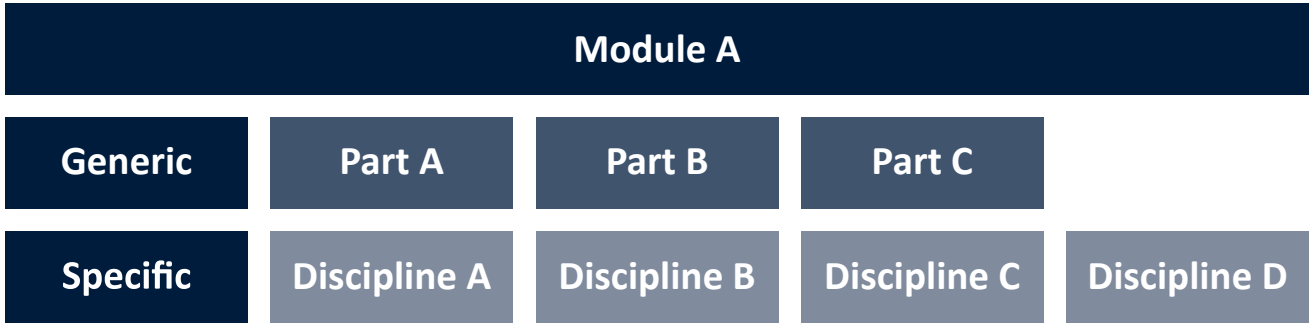
The project team developed the UM rubric to support teaching staff with incorporating information literacy into their courses. The rubric presents ILOs that include the level of attitudes and knowledge practices that students acquire over time. The content of these ILOs is based on the four framework dimensions. The developmental rubric is structured into four levels: (1) Novice, (2) Intermediate, (3) Competent, and (4) Advanced. These levels demonstrate the differentiation of attitudes, knowledge level, and skills level between a novice and an advanced bachelor student in a specific area of information literacy.

The project team conducted 11 pilots within faculty courses to translate the rubric ILOs into teaching and assessment. We followed a 5-step process to co-create these pilots. These steps were 1) Gather information, 2) Build, 3) Pilot, 4) Evaluate, 5) Scale & Sustain (see figure above). Scale and sustainability of the project will be discussed during meetings between library management and the vice-deans of education (Fall 2020).

The online modules consist of several micro-modules, each with their own difficulty level, that together form the whole of dimension from the UM framework. Every micro-module can be completed separately, and ideally consists of a generic part and discipline specific parts, based on student and/or teacher needs.

What's next?

Chapter 4 presents the Do's, Don'ts, and Don't knows that inform the sustainable implementation of the Information-Wise outcomes.



Internal model structure

Do's

1) Ensure the sustainable implementation of the information literacy curriculum into faculty programmes and courses
2) Make an inventory of information literacy practices in faculty programmes and courses
3) Continue integrating information literacy skills training into Continuing Professional Development
4) Continue building partnerships on information literacy education between the library, EDLAB, UM faculties, and other support services
5) Use Canvas as a tool to enhance information literacy education
6) Continue conducting research on the needs and effectiveness of information literacy practices

Don'ts

1) Offer workshops/lectures about information literacy, as part of a course, that are disconnected to the subject content
2) Copy the UM rubric ILOs into your course books
3) Create new information literacy activities without having an overview of what is already offered at your faculty

Don't Knows

1) How to follow-up on Information-Wise and maintain momentum?
2) How will the program look like for master and PhD students?
3) What will be the final agreements with the faculty?

1. Vision of Information Literacy Education at UM

1.1. Background

In the Year 2020, we experienced a global crisis: COVID-19. A related phenomenon was the raise of disinformation, also called disinfodemic by UNESCO (UNESCO, 2020). This wave of disinformation results in public distrust in media and therefore threatens democratic values. Education can play a major role in responding to this challenge by teaching learners from all ages to be information literate: discover credible sources, critically evaluate information with which they engage; ethically organize information, and engage actively and consciously in the creation and sharing of information.

At Maastricht University (UM), the importance of information literacy is widely recognized – students require structured support in dealing independently with (academic) information, and encouragement to develop creative and critical approaches when faced with complex questions and sources. Especially in a problem-based learning (PBL) environment, which advocates a constructive, contextual, collaborative and self-directed approach toward learning and knowledge creation (Dodd, 2007, Dolmans, 2019; Santharooban & Premadasa, 2015). Given today's digital and technological developments, such as big data and social media, we, as an institute for higher education, need to examine our role in providing information literacy education that meets the standards and challenges of the digital era.

1.2. The project aims

In this light, the education innovation project Information-Wise launched in March 2019. Project Information-Wise is a collaboration between the Maastricht University Institute of Education Innovation (EDLAB), the University Library, and all six faculties, which aims to create an evidence-informed programme for information literacy at UM. The project team decided to start designing this programme for bachelor students, as it will be used as foundation for potential Master (and PhD) programmes. More specifically, the project aimed to:

- Get an in-depth and comprehensive understanding of the issues students face regarding their information literacy skills from both a student and teaching staff perspective
- Developing a coherent and blended information and digital literacy programme with generic and discipline-specific modules, in which students from all faculties will gain knowledge about, practice, and receive feedback on their information literacy skills.
- Piloting and constructively aligning these modules in different faculty courses to evaluate the effectiveness.

In order to get an in in-depth understanding, academic literature was reviewed on a) the current trends in the changing information landscape and b) how to assess informed learning. The next step was to conduct empirical research on the challenges that students and academic staff face in dealing with information during learning. These outcomes were the basis for the development of the UM information literacy framework (thereafter UM framework), which provides a university-wide approach for information literacy skills education at UM. In line with the EDview recommendations (EDview, 2018), the framework vision embraces the PBL principles: learning as a constructive, collaborative, contextual, and self-directed process. It centres information literacy as part of students' learning process. At the core of this vision is the UM Bachelor student, who is confronted with a flood of information created by the quick and easy access to a wealth of (online) information sources as a consequence of the changing information landscape. Why does the student need to plan a search, stop searching, evaluate the trustworthiness of a source and why should a student organize information? Which steps do students need to take to further develop their information literacy skills? How can academic staff support this development? To support staff and students answering these questions, the framework envisions an upgraded academic skills trajectory that teaches students gradually how to be self-reflective and critically when using information at the university and beyond.

[1]

1 EDview is a project researching and improving the state of Problem Based Learning at Maastricht University.

1.3. The UM information literacy framework

For more information on the UM information literacy framework, see the midterm report.

The UM information literacy framework combines content from well-known frameworks for information literacy (i.e. ACRL, Cambridge, SCONUL) and includes attitudes and knowledge practices. Attitude can be defined as a learned tendency to evaluate objects, subjects or persons in a certain way. Knowledge practices are the proficiencies or abilities that students develop as a result of their comprehension of an information literacy component (ACRL, 2016). The information literacy related attitudes and knowledge practices are organized in four different dimensions of the UM framework (see fig. 1)

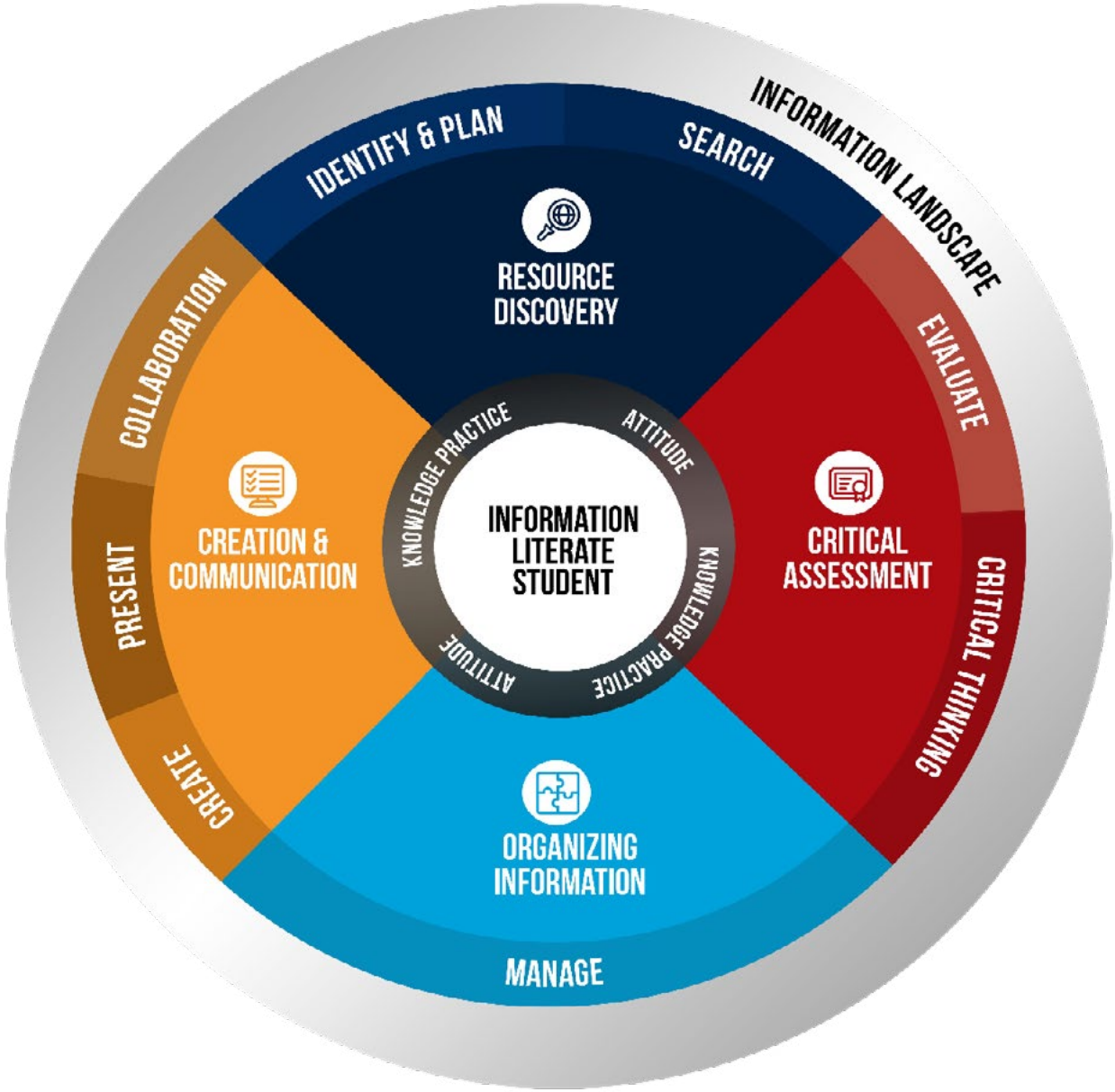


Figure 1. UM information literacy framework.

Resource Discovery

Learners who develop skills and attitudes relating to resource discovery are able to **identify** their information need and **plan** a search accordingly. They are able to **search** for resources in an effective manner. They recognize specific formats and types of information appropriate to answer research questions or problem statement.

Critical Assessment

Learners who develop skills and attitudes relating to critical assessment take a critical approach towards information that comprises critical thinking about, **evaluation**, and critical reading of information. They **think critically** and reflect on the author's and their own biases.

Organizing Information

Learners who develop skills and attitudes relating to organizing information engage with relevant information, develop strategies (e.g. concept mapping) and use tools (e.g. reference manager) for **managing information** of all kinds.

Creation & Communication

Learners who develop skills and attitudes relating to creation & communication see themselves and act as information creators in addition to information consumers. They understand that **information creation**, such as presentations, data visualization, and publishing blog posts, is an iterative process, which entails evaluation, revising, and re-purposing of discovered content. This implies also careful **communication** in virtual settings considering the ethical perspective in online conversations. They **present** content and themselves online and thereby consciously shape their digital presence.

2. Research

**For the full details of the research part of this project, see the midterm report.*

2.1. Two literature reviews

A central deliverable of this project was the design of an evidence-informed information literacy programme for bachelor students at Maastricht University. To reach that goal, two extensive literature reviews were written. The first one reviewed the changing role of information literacy skills in higher education and related trends (Pichel, Jongen, & Hospers, 2018) which led to several recommendations:

1. Follow evidence-based information literacy driven by quantitative and qualitative data analysis;
2. Build an extensive partnership between library and faculties;
3. Integrate frameworks (e.g. ACRL) into current and future information literacy activities and to harmonize it with academic skills education in the faculties;
4. Develop information literacy instructions linked to course assignment and learning goals or embed these with programmes or course syllabi;
5. Familiarize academic librarians with frameworks (e.g. ACRL) and professionalize their pedagogical understanding and teaching.

The second narrative review (Jongen, Pichel, Vernimmen, & Hospers, 2018) resulted in recommendations on how to analyze informed learning at Maastricht University:

1. Analyse to what extent the functional, situated, and critical approach of informed learning are practiced with a mixed approach;
2. Quantitative analyse the issues related to information use within the learning process in a student population and within teaching practice in a teacher population by using surveys;
3. Qualitative analyse how students and teachers deal with information in the learning process by using focus groups;
4. Quantitatively analyse to what extent intended learning outcomes (ILOs) in course manuals meet information literacy standards;
5. Use both formative and summative assessment to measure information literacy skills and include the four levels of assessment (defined by Kirkpatrick, 2009).

To read the literature reviews, click here for access to the open monograph.

2.2. Surveys and guerrilla interviews

To follow up on these recommendations, a university-wide survey was distributed to students and teachers in the bachelor programmes of Maastricht University. In total, 632 students and 86 academic staff members responded to closed and open questions in order to analyse the challenges of these groups in dealing with information in the learning and teaching process. The analyses of this survey provided a number of recommendations, mentioned below. In addition, 21 guerrilla interviews were performed to interview students about the use of information in their studies.

2.3. Recommendations for Information Literacy Education at UM

General Recommendation: Employ constructive alignment approach to integrate information literacy within all curricula.

Constructive alignment provides a framework for ensuring that information literacy efforts align with intended learning outcomes, learning activities, and assessment tasks (Biggs & Tang, 2011). It helps to clarify what students need to learn, how to develop information literacy skills further, and how these skills will be assessed (Erlinger, 2018; Salisbury et al., 2012). The following recommendations address the employment of constructive alignment, intended learning outcomes, teaching and learning activities and assessment. In order to do so, faculty teachers and information specialists from the University Library should be supported by means of professionalization programmes.

#1: Design a bachelor pilot to explore scaffolding the use of provided and non-provided literature within a course to stimulate self-directed learning.

Descriptive analyses of the survey raised concerns about the lack of stimulating and guiding self-directed learning. Students indicated to mainly focus on the resources provided in the course manual to find information about a topic, while sometimes looking beyond sources provided by the course coordinator. In addition, they indicated that they sometimes have to search independently. No differences were found between first, second, and third Bachelor year in independent searches by the students.

#2: Diversify the approach to teaching resource discovery: make students aware of the difference between (academic) search engines and academic databases and discuss the advantages and disadvantages of each.

The results of the survey show that Bachelor students always use the sources provided in the course manual to prepare a PBL class. The results also show that Bachelor students use Google most of the time, while students use databases (e.g. PubMed, Web of Science, PsycINFO) of the University Library about half of the time.

#3: A larger component of critical assessment of information should be developed in each bachelor curriculum.
Students indicated that they critically evaluate sources which they read most of the time. Teachers had a different perception. They indicated a significant lower score to what extent students critically evaluate sources. In the open questions, students indicated certain characteristics for evaluating sources, but no systematic evaluation was deployed. This conclusion was supported by the guerrilla interviews.

#4: Teach students in organizing information. Tools (e.g. reference management tools) could be used to develop this skill. Educating specific tools should not be a goal in itself, but a means in enhancing skills to organize information.
One of the main outcomes of the survey was that a majority of students indicated to never use a reference management tool, such as EndNote, even though they indicate to be able to reference properly.

#5: Scaffold Information literacy activities that support students in the creation of (academic) output.
There was a disagreement between students and teachers regarding the ability to formulate a research question. Students indicated that they feel confident in formulating a research question while teachers provided a lower score. This could indicate that students overestimate their abilities in this complex task. Given that first year students lack research experience and might feel insecure (or overconfident) it is important to provide sufficient guidance for students to master such difficult and complex tasks (e.g. creating a research question, writing a research outline). Breaking down the task into smaller parts could reduce the cognitive overload of students. For example, students could practice the different ways to narrow their research focus by finding relevant keywords before they have to come up with the full research question. This process of reducing support as learners acquire more expertise is called scaffolding.

#6: Teach students how to create and communicate information in a variety of formats (from blogs to academic paper) on multiple digital platforms (e.g. LinkedIn, Facebook).
What becomes apparent throughout the survey responses is that students often perceive themselves as consumers of information instead of creators. The results of the survey supported the concerns that students take a rather passive role by using the provided resources in PBL classes. Students should be stimulated to be creators of information (in a range from blog posts to academic papers) on multiple digital platforms.

#7: Design a Bachelor pilot to measure informed learning with an authentic assessment component within the disciplinary context.
One of the limitations of administering a survey is that it only measures the perception of students or teachers, while it does not measure learning, behavior or long-term effect (Erlinger, 2018). The survey provides no evidence of actual attitude or behavioral changes in learning how to deal with information. In addition, the effects of library workshops are mainly evaluated by surveys, providing only a perception of students about the effectiveness of these workshops. Thus, informed learning (learning about information in the context of a specific discipline) needs to be authentically assessed, meaning that assessment should be contextualized, measure higher-order skills, and foster motivation and engagement.

#8: Add information literacy training in the teacher professional development programmes and training in teaching in library professional development programmes.
Several teachers indicated that they would like to receive more training in how to teach information literacy. This is in accordance with results from EDview (a project researching the state of Problem Based Learning at Maastricht University in 2018), showing that teaching staff feel a lack of knowledge and skills to provide direction in searching and reviewing literature. This was stated in the light of information overload.

3. Information Literacy Programme

The information literacy programme consists of the UM framework, UM rubric including ILOs as well as an online curriculum with generic and domain-specific modules. The structure of the programme is flexible and each part should be adapted to the specific requirements and needs of each faculty programme. The project team wrote a **rubric manual** that outlines different scenarios for implementing the information literacy programme into curricula, following the constructive alignment approach. The rubric guideline was informed by the research outcomes (see Chapter 2) and learnings from the information literacy pilot activities (see Chapter 3.2).

3.1. Rubric for Information Literacy Education at UM

**For the full details of the UM information literacy rubric, see the rubric manual.*

The UM information literacy rubric presents ILOs that include the level of attitudes and knowledge practices that students acquire over time. The content of these ILOs builds on the dimensions and sub-dimensions of the UM information literacy framework. The developmental rubric is structured into four levels: (1) Novice, (2) Intermediate, (3) Competent, and (4) Advanced. These levels demonstrate the differentiation of attitudes, knowledge level, and skills level between a novice and an advanced bachelor student in a specific area of information literacy.

3.2. Information Literacy Pilots

The challenge for the project team was to translate the conceptual framework and rubric ILOs, as well as the research outcomes, into teaching and assessment activities. We therefore conducted a series of pilots within faculty courses to try and test a framework-inspired approach to teaching and assessment. The goal was to pilot within at least four out of six UM faculties in order to account for discipline specific differences and challenges with regards to information literacy education.

Inspired by prominent instructional design approaches (e.g. radical prototyping, ADDIE model) the project team developed, evaluated, and learned from eleven pilots. The process involved five steps: 1) gather information, 2) build, 3) pilot, 4) evaluate, and 5) scale & sustain (see figure 1). The developed learning interventions addressed at least one of the framework dimensions and followed at least one of the recommendations of the research phase (for an overview of the pilots see Appendix A). Although the pilot development and evaluation followed a logical structure, we did not progress through a series of sequential stages but followed a non-linear process. This had several reasons; next to common challenges within courses (e.g., low student participation in pilot), also external circumstances (i.e. COVID-19) required logistical and instructional flexibility from the pilot participants.

Gather Information

The design of the pilots was informed by the insights we gained from the previous research (literature reviews, quick scan) and recommendations based on a UM-wide survey. The interventions were built on evidence-based pedagogical approaches (e.g. constructive alignment, self-regulated learning) to ensure the application of proven concepts to improve students' information literacy skills. At the same time, we were inspired by information literacy activities from other universities (e.g. VU Amsterdam), and developed pilots that contained more experimental elements (e.g. digital detox workshop, information literacy game).

Build

In this phase, we explored assumptions, leading to hypotheses on how the pilots will affect students' information literacy skills in the selected courses. For example, in one pilot we hypothesized that because of added information literacy activities, students will critically evaluate the quality of sources

Figure 2. Information-Wise pilot process
For each conducted pilot, a visualized poster is available with additional information about the teaching activity, student and teacher workload, as well as tips and tricks for assessments and logistical components. You can find an overview of the posters here.

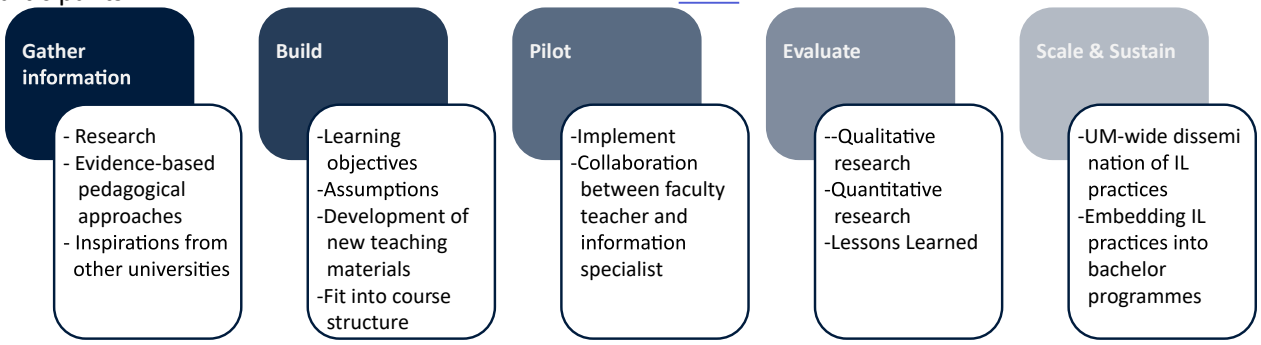


Figure 2. Information-Wise pilot process

and select the most appropriate sources for their research plan (See Appendix B for description of this pilot). Such propositions lead to the design of new teaching materials in close cooperation with the pilot participants.

We designed the pilots according to a bottom-up approach, closely cooperating with project team members who were in charge of courses and thus had the power to test and experiment. In the pilot development phase, information specialists from the University Library played an active role next to the course coordinator. They consulted and advised course coordinators on potential information literacy activities. Their role was also to ensure that these activities are constructively aligned with the ILOs, teaching activities, and assessments of the course in which the pilot took place.

Pilot

In this phase, we ran the pilots in the context of a real classroom and under realistic conditions (e.g. students write a research paper). The pilots intended to translate and integrate UM information literacy framework dimension(s) as well as the research recommendations into faculty courses. In this stage, information specialists and project members collaborated closely with the respective course coordinator to facilitate the pilot implementation. For the pilot execution, it was important to align the pilot activities with the course structure and flow. In one pilot, it was sufficient to add a short task to one of the tutorial meetings, as well as adding 2 questions to the final examination. See Appendix C for more information on this pilot.

Where did we pilot?

We piloted in five out of six UM faculties, which allowed us to account for faculty-specific differences and expectations. The pilots ran in both academic skills courses and subject courses. It was important to not only teach information literacy as a discrete skill (i.e. functional approach), but also practice information literacy to better grasp the subject content (i.e. situated approach). This approach is in line with informed learning, which emphasizes that a student should use information in the context of learning about a topic (Bruce & Hughes, 2010).

Evaluate

In the evaluation phase, we analyse the pilot outcomes based on the assumptions we made and reflect back on the initially formulated hypotheses. This yielded results about both the effectiveness as well as limitations of such learning interventions in a course setting. The evaluation phase lead to reflections and insights on the opportunities and necessary changes to improve the instructional material. Such insights can be used to scale up the piloted learning interventions within the UM community.

In the evaluation phase, we worked closely together with teachers and students, and tried to gain insights into their experience. We used a mixed method approach using qualitative (e.g. interviews, focus groups) and quantitative (e.g. pre-and post-test) measurements to collect data about the students' learning experience. One formative approach to assessment was the use of a learning diary, which showed students' reflection and progress of developing information literacy skills over time. The collected data gave us indication of how the pilots affected students' knowledge, ability, and attitude towards information literacy.

See Appendix D for more details about the learning diaries approach.

Scale & Sustain

The final step of the development process is **scale and sustain.** Scaling implies the dissemination of project deliverables; during the project period, most activities have been tested within one programme. By scaling, we intent to disseminate these activities and ensure that project deliverables are implemented university-wide. Sustaining implies durable and lasting implementation within UM educational programs.

The goal of this project is to better integrate information literacy education within UM programs, instead of offering singular workshops on the topic. During the pilot period, teaching activities have been designed in a way in which they can be easily integrated within Bachelor courses. Therefore, the next step is to go into the faculties, and define "how" these practices should be embedded in educational programs.

How will this be achieved? In the fall of 2020, conversations will take place between the faculty vice-deans of education and the library management in which the "how to" of the sustainable implementation will be discussed. The implementation approach will differ per faculty, as each faculty is organized in a different way. Nevertheless, the ideal outcome of these conversations is a clear defined strategy as to how and where information literacy practices will be embedded within the respective faculty programs. For this, it is very important that the right people join in on these conversations. Here, we would stress to involve those that have the power and mandate to change the course content and/or are responsible for academic skills trajectories. Second, focus on integration within the course content, instead of offering our practices as a standalone and additional workshop or activity. In order to create relevance and importance, it works best when information literacy practices are integrated in courses, and connect to the subject that the students deal with.

3.3. Online Modules

One of the goals of the Information Wise project was to "*develop a coherent and blended information and digital literacy programme with generic and discipline-specific modules in which students from all faculties will gain knowledge about, practice, and receive feedback on their information literacy skills.*" The information specialists in consultation with project team created an online information literacy curriculum that can be easily integrated into courses and curricula.

Development approach

For the overall development of the online curriculum, we followed the ADDIE-model for e-learning. The ADDIE model is a five-step process used to guide instructional designers in developing instructional materials. As such, the phases are Analysis, Design, Development, Implementation, and Evaluation (Davis, 2013).

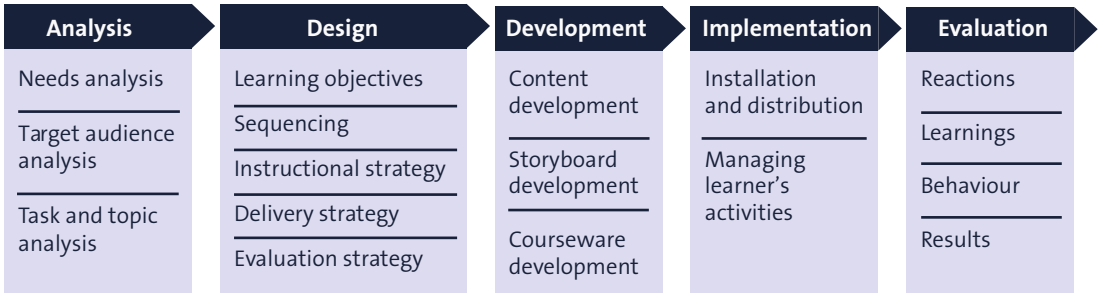


Figure 3. ADDIE model

The first stage, the analysis, resulted in the UM framework. Based on this framework, a rubric was developed, including clear intended learning outcomes that formed the basis for the development of stage two: the design. This second stage resulted in a curriculum blueprint, which outlined the structure of modules, the delivery method, and of course the design principles. When this was finished, we went into stage three: development. By using module and slide plans, we structured the development stage, and provided the core team with the right information to start building the courseware.

**The blueprint of the online curriculum is available (here).*

Structure

In order to better cater to faculty needs, we decided to build micro-modules, each with their own difficulty level, that together form the whole of dimension from the UM Information Literacy framework (see figure below). Every micro-module can be completed separately, and can consist of a generic part and discipline specific parts, based on student and/or teacher needs. Refer to Figure 4 to for the internal module structure.

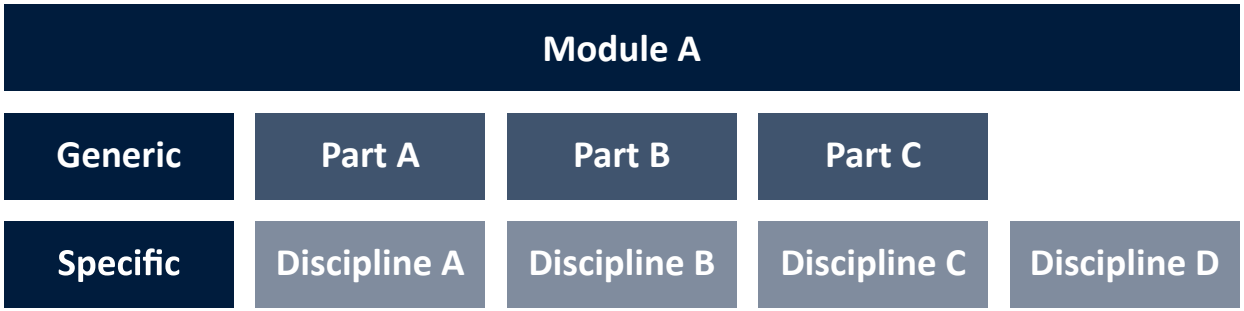


Figure 4. Internal model structure

Implementation

Access to the online content goes via **discipline**, as well as via the **framework dimensions.** The content is accessible via the Library website, and is easily embedded into Canvas. We decided to split the framework into smaller chunks of micro-modules (as mentioned above). This makes it easier to integrate specific elements into (online) courses, for example embedded within a Canvas assignment. All modules are built with the same structure in mind, and participants receive a certificate of completion when finished.

At the end of the project, we developed micro-modules for each framework dimension, and will go into stage four: **implementation**. In the upcoming academic year, our information specialists will talk with faculty programme and course coordinators on how to embed information literacy into their curriculum and courses. Concurrently with the implementation, we evaluate and adjust the micro-modules accordingly. In this way, we aim to provide an up-to-date and contextual online curriculum that fits well into PBL education.

4. How to continue? Do's, Don'ts, and Don't Knows

The project has delivered an evidence-based programme for information literacy education at UM. The next step is to ensure a sustainable and structural implementation into faculty education. In this final chapter, we present the Do's, Don'ts, and Don't knows that will inform the further uptake of the project outcomes.

4.1. Do's

1) Ensure the sustainable implementation of the information literacy curriculum into faculty programmes and courses

a. The Library will take up the conversations with the vice deans of education in autumn 2020 to make an agreement on how to sustainably implement the project findings into their bachelor programmes. The following topics are suggested as discussion points:
   i. Project outcomes (recommendations, framework, rubric, pilots, online modules) and its implication for faculty education
   ii. Appoint faculty liaisons (i.e. change agent) who are responsible for implementing information literacy into faculty education. Clarify administrative questions on financing, task description, and available hours

2) Make an inventory of information literacy practices in faculty programmes and courses

a. Use the framework vision, rubric ILOs, and recommendations as the guideline to identify information literacy practices at your faculty (i.e. curriculum mapping)
b. Use the rubric guideline as a manual for doing so
c. Add new posters to the current databases with practical and engaging information literacy practices (see overview of posters)

3) Continue integrating information literacy skills training into Continuing Professional Development

Several teachers indicated that they would like to receive more training in how to design and teach information literacy practices. This is in accordance with results from EDview, showing that teaching staff feel a lack of knowledge and skills to provide directions in searching and reviewing literature.
We recommend to expand the current offer for CPD workshops related to information literacy education by:
- Providing a workshop on translating framework & rubric into teaching activities and assessments; Divide this workshop into basic (for course coordinator) and advanced (for programme coordinators)
- Connecting to UTQ competences (for example; education design, teaching delivery)
- Providing support for the self-directed use of reference lists
- Thinking of alternative ways to inform about information literacy topics such as (online) lunch lectures and other creative (online) formats

4) Continue building partnerships on information literacy between the library, EDLAB, UM faculties, and other support services

- Institutionalizing information literacy education costs effort and time. Building a better partnership between the library, EDLAB and faculties therefore determines the quality of information literacy education at Maastricht University. Information specialists from the library together with educational specialists can use their rich experience in teaching information literacy to students. Faculty teachers can provide information specialists with their individual needs and requests.
- The library and SSC Career Services and UM Psychologist successfully co-designed a workshop on digital detox, which has been piloted and offered in multiple faculties.
  o Further collaborations are advisable on this subject (e.g. create digital detox online module) and other ones (e.g. information literacy skills for employability)

5) Use Canvas as a tool to enhance information literacy education

a. Naturally integrate the information literacy programme into Canvas online courses

6) Continue conducting research on the needs and effectiveness of information literacy practices

a. Identify the available data from past information literacy pilots and check if further analyses are possible and useful
b. Assess and evaluate the impact of the pilot activities and online modules on students' attitudes and behavior related to information literacy (i.e. actual learning)
c. Examine new developments in pedagogy and didactical approaches for information literacy education (game based, online learning approaches, etc.)
   i. This also includes new developments around AI, big data, etc.

4.2. Don'ts

1) Offer workshops/lectures about information literacy, as part of a course, that are disconnected to the subject content

Previous literature reviews at UM (Pichel et al., 2018; Jongen et al., 2019) indicated that "one shot" workshops are inefficient in helping students to develop information literacy skills. As a consequence, students and teachers perceive the learning and teaching around information literacy as disconnected from the course subject.

2) Copy the UM rubric ILOs into your course books

While the ILOs of the developmental rubric can be helpful in (re-)designing information literacy practices, they should not be copied into course books. As these ILOs need to fit into the overall programme vision, as well as the discipline specific teaching and learning activities within the course manual, an adjustment of these ILOs for meeting specific programme needs should be considered. As such, the rubric ILOs can be translated into course ILOs.

3) Create new information literacy activities without having an overview of what is already offered at your faculty

Some programmes and courses already explicitly address information literacy throughout the curriculum. It is therefore not always necessary to change or add new ILOs or activities. First, a proper assessment of the needs and nature of the programme / course design should be conducted before adding anything new to it. The information specialist can offer support with making this inventory.

4.3. Don't Knows

1) How to follow-up on Information-Wise and maintain momentum?

In order to keep the momentum we suggest initiating projects at UM that follow-up on the Information-Wise project. Ideally, these initiatives build on the Information-Wise project outcomes and ensure further sustainable implementation. We propose the following projects:

- Apply for SURF grants
  - o One potential project could address the implementation of the information literacy online modules into faculty programmes and courses. Deadline for the submissions is the 15th of December: https://www.surf.nl/stimuleringsregeling-open-en-online-onderwijs/stimuleringsregeling-open-en-online-onderwijs-pijler;
- Connect to national and international information literacy projects. The library is already involved in the national group for information literacy. International conferences such as LILAC provide an additional platform to exchange knowledge and experiences concerning information literacy education;
- Explore innovative forms of teaching information literacy. For instance, Hogeschool Utrecht used virtual reality to teach information literacy skills;
- The information literacy game is one the pilots of Information-Wise and will not be ready before first of September
  - o The first prototypes will be ready in September 2020, and will need further testing;
- Seek for connection to other UM projects such as EDview and Global Citizenship Education and connect;
- Involve Students in the design and research of information literacy skills
  - o Colleagues from the University library design and promote challenges related to information literacy and act as a mentor for students. Challenges can be submitted to the honours programmes of EDLAB and the faculties.

2) What will be the final agreements with the faculty?

The newly appointed UB manager will sit down with the vice-deans of education in fall (beginning of Academic Year 2020/21) to make agreements and formulate a plan about further scale up of information literacy education in faculties.

3) How will the programme look like for master and PhD students?

The Information-project resulted in an information literacy programme that forms the basis for master and PhD programmes. It is advisable that the further development of information literacy for master and PhD students will continue in close cooperation with the research support team of the University Library as well as faculty stakeholders. The existing UM information literacy rubric could be expanded to account also for the expected level for master and PhD students.

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6. Appendix

Appendix A) Overview of Information Literacy Pilots

Pilot	Faculty	Programme	Year	Dimension*	Recommendations
Learning Diary	FHML	Health Sciences	BA year 1	RD, CA, OI,	1,2,3,4
Workshop Searching & Referencing	FPN	BA Psychology	BA year 2	RD, OI	2
Assessment Rubric	FSE	UCM	BA year 1	CA	1, 3, 7
Bullshit Lecture	FSE/FPN	UCM/ BA Psychology	BA year 1 & 2	CA	3
Critical Assessment Online Tutorial	FSE	MSP	BA year 1	CA	3
CRAAP-test	SBE	Fiscal Economics	BA year 1	CA	3, 7
Digital Detox Workshop	SSC/Library	Available for all faculties	All Years	CC	6
Self-Assessment Rubric	FHML	Biomedical Sciences	BA year 1	RD, CA, OI, CC	1, 2, 3, 4
Search Planning Form	LAW	European Law	BA year 1	RD	1, 2
CPD Workshop	All faculties	Available for all faculties	All Years	RD, CA, OI, CC	8
Information Literacy Game	All faculties	Available for all faculties	All Years	RD, CA, OI, CC	6

*RD = Resource Discovery, CA = Critical Assessment, OI = Organizing information, CC = Creation & Communication

**1 = Encourage self-directed learning, 2 = diversify resource strategies, 3 = increase focus on critical assessment, 4 = organize information beyond reference tools, 5 = scaffold support in creating & communicating, 6 = support various formats, 7 = authentic assessment, 8 = include in CPD

Appendix B) Case example: Co-designing information literacy teaching activities (FSE)

Project members from the University College Maastricht (UCM) intended to put more emphasis on the Critical Assessment dimension in their course Academic Skills Introduction II. The information specialist liaison for this faculty and a member of the core-team wrote a proposal for including information literacy ILOs and activities into the course book. They followed the constructive alignment approach, which indicates that new teaching activities need to match the intended learning outcomes and assessments of the course.
As such, the pilot team decided to adjust and incorporate the UM rubric ILOs into an existing grading rubric, which assesses students' performance for writing a research plan. Based on these ILOs and assessment criteria, the team designed a lecture on "bullshit" that provided explanation and tips on how to identify misinformation and biases in online environments. Next to that, the course coordinators created an assignment in which students had to read and critically assess an academic journal paper, and thereby apply the knowledge they acquired from the lecture. Finally, because of these activities, it was hypothesized that students will improve their abilities to evaluate the quality of sources and select the most appropriate sources for their research plan.

Appendix C) Case example: Pilot in first year course at Fiscal Economics bachelor programme (SBE)

In the first introductory course of the Fiscal Economics Bachelor programme at the School of Business and Economics, students deal with academic and non-academic sources. In period 1 of Academic Year 2019/2020, an information literacy pilot was aligned with the course structure to support students in comparing the quality of different types of sources. In a collaborative process, the course coordinators and the information specialist designed a new task to achieve this endeavour. In this task, students had to re-evaluate some of course sources to understand the differing quality and to gain more insight in the usefulness of available sources. The approach used for this evaluation was the CRAAP-test. The CRAAP test is designed to check the currency, reliability, authority, accuracy, and purpose of various sources. To ensure constructive alignment of the teaching activity a question regarding the application of the CRAAP test was included in the final examination. Since the added task and exam question were situated in the course syllabus, it was not much additional work for the course team to integrate the information literacy activities.

Appendix D) Case example: Evaluating learning diary pilot at Faculty of Health, Medicine and Life Sciences (FHML)

In the first year of the Bachelor program Health Sciences (FHML), students need to conduct a written assignment. Next to writing, students need to find at least two additional (academic) sources in the Online Library and explain their systematic search strategy. In the first weeks of the course, students receive training in systematic literature search and EndNote provided by the University Library. The pilot team included information literacy related prompts (i.e. learning diary) to the reflection assignments, where students could enter their learnings from the library workshops and assignments into personal perspective. The students wrote three diary entries over a period of three weeks, answering a set of reflective questions related to their search, evaluation, and organization of sources. We hypothesized that by employing a reflective diary, students become more critical towards the information they use and will select appropriate sources based on their information need.

In order to capture the learning progress of the students, we analyzed the learning diaries both quantitatively and qualitatively. We used SPSS (statistical analysis) and ATLAS Ti (coding) for this analysis. Preliminary results from the qualitative analysis indicated that students who actively used the learning diary showed a more critical attitude towards the information they use and selected appropriate sources based on their information need. Yet, the statistical analysis did not yield any conclusive nor significant results. We identified two main reasons for this. First, some students filled the diary at a later stage and therefore received information literacy training when completing the pre-test of week. Second, all students received a library workshop on systematic literature search before the pre-test was conducted and hence acquired previous knowledge on information literacy. To gain more insights, we conducted a focus group with the mentors who assessed the writing assignments of the students. From the input of the mentors and the analysis, we concluded that learning diaries are most effective as a mandatory part of the course (during the pilot period, it was voluntary), as input for feedback between students and mentors, as well as part of the final assignment.