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Addressing Security Challenges in an Interconnected World

	Blended co-design of education: Way of working report

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1. Objectives

In this document we share the design approach chosen to develop the MSc Security Management curriculum and the modules that make it up. The chosen design methodology can be characterized as being transdisciplinary, team-based, in a blended setting (i.e., combining on-site and online design meetings). Synchronous communication was used in support of the online part of the design. The design thereby followed a "practice what you preach" approach as it reflected the context (e.g., transdisciplinary) and nature (e.g., a blend of online and face-to-face) of the interaction students will experience in the envisioned MSc.

2. The need for co-design of education

Especially in the last two decades the need for higher education to educate people in dealing with complex or "wicked" problems grew exponentially. Reasons for this include, e.g., rapid changes in the labour market, increased interdisciplinarity of professional domains, a decrease in the half-life of knowledge, increased mobility, and rapid development of information- and communication technology (ICT). This combination of related factors leads to the need for Higher Education (HE) to become more flexible, responsive, and student-centered (c.f., Gaebel, Zhang, Bunescu, & Stoeber, 2018; Orphanides, 2012). Educational research shows that these developments also requires higher education to empower students by developing "boundary crossing competence", or the ability to effectively operate, communicate, and co-create knowledge in a transdisciplinary context. Moreover, the boundaries between different disciplines and perspectives have been shown to be the most powerful places for learning and the co-creation of knowledge (Akkerman & Bakker, 2011; Gulikers & Oonk, 2019). Yet, examples of how such learning environments could be designed and what they could look like are sparse (Gulikers & Oonk, 2019).

The current document is set in the context of the safety and security domain, which includes urgent and complex challenges such as immigration, natural hazards, terrorism, and cybercrime. All of these are complex challenges that encompass rapid development of knowledge and knowledge exchange, which demand collaboration from stakeholders across sectors, regions and levels of society to develop sustainable and practically meaningful solutions. In addition, these challenges demonstrate the need for a holistic and multi-agency approach in addressing cross boarder narratives.

3. A methodology for the co-design of education

Within the ISM-KA project, RSM's Learning Innovation Team (LIT) was charged with coordinating the educational design of the ISM Master. LIT developed a process that can be applied to multiple educational design settings. As LIT applies the Educational Innovation Process (EIP) across the full portfolio of RSM education (pre- and post-experience, so from BSc to Executive MBA curricula), the EIP also demarcates the value LIT can (and cannot) bring to enhance educational innovation within a specific context. It thereby not only brings clarity to the design process, but also informs stakeholders (e.g., deans, programme managers, teachers) on what to expect from the process and LIT as facilitator of its different phases. The EIP consists of five phases (see Figure 1). In the remainder of the present document, each phase is described in a general way. The specific implementation depends on the context and the outcomes of each preceding phase.

Two overarching developments benefited the implementation of the EIP. The first is the creation of a stakeholder map and regular revision. Having an up-to-date overview of different stakeholders, roles and responsibilities helps to facilitate effective communication and involve the right people when implementing the process. Second, LIT ensured a sounding board on educational innovation was established, with representatives from all stakeholders relevant to educational innovation like the dean of education, department chairs, academic and executive directors, the head of the examination board, student representation, etc.

In the following, each EIP phase will be described. When applicable, specific design choices that were made in the MSc Security Management design process are included in the current document. An elaborate case study regarding design choices and the experience using the EIP during the design process can be found in Giesbers, van den Doel, and Wever (in Press).
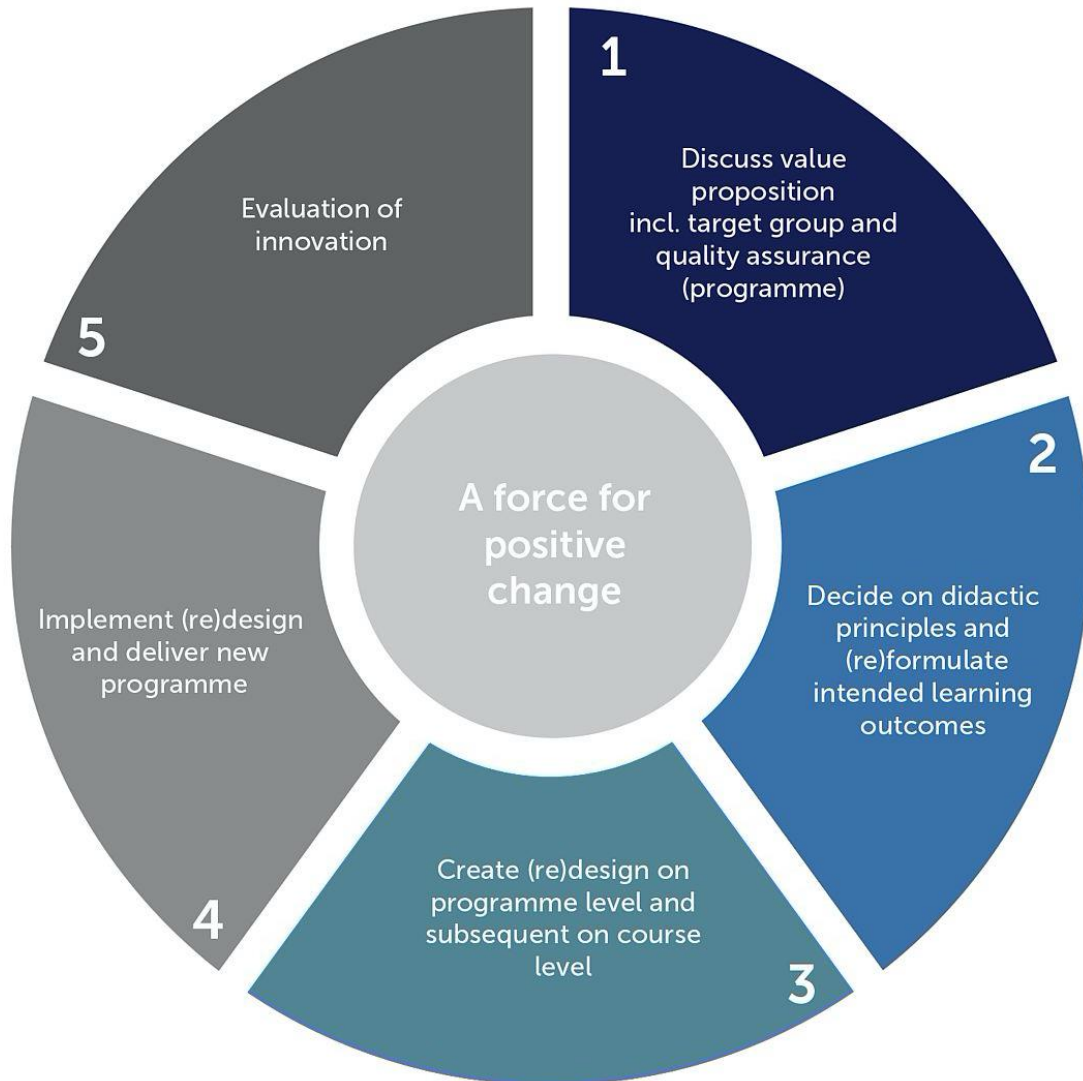
Figure 1. The Educational Innovation process used by RSM's Learning Innovation Team[1].

3.1. *Phase 1: Value proposition*

The first two phases are aimed to get a thorough understanding of the context in which a certain innovation initiative takes place. Organizational aspects are covered during Phase 1, which usually takes place in collaboration with project director(s) and other stakeholders on a management level. The elements that are discussed in this phase are presented in Table 1.

For the design of the ISM MSc, many elements were already defined in the project proposal. Nonetheless, it proves useful to regularly revisit the questions of the first phase and see if everything is still on track. For example, a design process in the context of a transdisciplinary, international consortium can be influenced by project factors (e.g., changes in the position of partners within the project), factors relating to stakeholder factors (e.g., multiple university and business policies), or a combination of both (e.g., changes in the position of partners within their university or organisation). Knowledge about who is involved in what,

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[1] The inner circle refers to the RSM mission to be 'a force for positive change in the world': https://www.rsm.nl/positive-change/our-mission/

responsibilities connected to roles and activities, and who the decision makers are in case of problems are not always as obvious as they seem and sometimes do not match with stakeholder expectations.

Also, the key performance indicators (KPI's) that need to be measured to show the extent to which the aims of the redesign have been reached are defined in Phase 1.

Table 1. Elements discussed during EIP Phase 1: Value proposition, target group and quality assurance.

Phase 1 element	Questions include
Purpose and scope	Why do we want to design a curriculum and/or course? What is our value proposition?
Target group	What student population are we targeting? How large is the population and is growth anticipated? Are there special characteristics? E.g., professionals, location, etc.
Unique Selling Points (USP)	How do we distinguish ourselves from potential competitors? Is benchmarking needed?
Key performance indicators (KPI)	What determines whether the effort is successful? Should the process and the outcome be measured to define success? How will quality be assured across time?
Criteria	Are there any boundary setting conditions for design and delivery?
Stakeholders, roles and responsibilities	Who is the business case owner? Who needs to be involved in the (curriculum and/or course) design? Who will be teaching? Who are the decision makers in case of problems?
Timeline	Which events are needed, and what are related dates and deadlines? E.g., kick-off, design start and end, delivery start
Financial	How high is the available budget? Are there any cost and revenue targets?

3.2. Phase 2: Didactic principles and learning outcomes

Phase 2 relates to the overall educational aspects such as the vision on education and the intended learning outcomes. Discussions in this phase might involve a larger group compared of contributors compared to Phase 1, as content experts normally take part at this stage. This phase encompasses the vision on learning, which departs from the educational values of the university and/or the school to ensure alignment. For example, when a school choses a specific didactic model, for instance Problem Based Learning (PBL), it makes most sense to adhere to this overarching choice. In case of the MSc ISM, this was not the case, and for several reasons (see

Giesbers et al., in Press) the choice was made for a community of learning approach in a blended context, using synchronous online communication.

Intended learning outcomes (ILOs, or curriculum level learning outcomes) and educational goals (EGs, or course level learning outcomes) are formulated and reviewed during this phase as well. Often, in the case of a curriculum development (like the MSc ISM) the ILOs are formulated during Phase 2 and the EGs prior to or during the course design workshops. The formulation of ILOs and especially EGs is guided by using the revised Bloom's taxonomy (Anderson & Krathwohl, 2001) as a basis.

Table 2. Elements discussed during EIP Phase 2: Didactic principles, ILOs and EGs.

Phase 2 element	Questions include
Vision and mission	What is the educational vision on which the design will be based?
	What is the mission statement for the curriculum and/or course?
	Do the vision and mission of the new design align with the vision and mission of the university and/or school?
Intended Learning Outcomes (ILO) and Educational Goals (EG)	What are the 4-6 main learning outcomes for the curriculum?
	What are the 4-6 main learning outcomes per course? (Can also be part of course design in Phase 3).
Learning Environment	What requirements for the learning environment follow from the target group characteristics, the educational vision, and didactic approach?
Professional development	Given the vision on education, the choice of didactic approach, and the choices regarding the learning environment: Is there a need for teacher professionalisation? E.g., online or blended didactics, assessment methods, adult education, etc.
	Which approach regarding teacher professionalisation would work best? E.g., group training, individual mentoring, small-scale intensive, a combination, etc.

3.3. Phase 3: Create curriculum and course design

After completing the first two phases, the (re)design itself defines the third phase. Carpe Diem (Salmon & Wright, 2014) has been chosen as the main educational design methodology as it:

1. can be applied to design education for multiple target groups (e.g., pre-experience, post-experience) and delivery modes (e.g., online, face-to-face, blended);
2. can be applied to curriculum, course and task level;
3. advocates educational design by a multidisciplinary team;
4. adopts the technique of blueprinting and storyboarding to create a joint narrative which supports a shared understanding and communication about the outcome; and
5. integrates quality control via feedback from team members, review and adjustment.

Carpe Diem is a so-called "backward design" method (McTighe and Thomas, 2003), meaning the first step is to define the desired end state in terms of ILOs and/or EGs, after which the assessment methods, learning activities, and learning content are defined consecutively and laid out in a so-called blueprint (layout) and storyboard (process map). We did deviate from the original Carpe Diem method (see Salmon, 2016), as some steps in the method did not fit our needs or context. For example, we did not adopt prototyping (i.e., building (parts of) the

design in a learning management system (LMS) to see if it works) as an integral part of the ISMKA design process as it wasn't clear which LMS(s) would be used in the delivery.

The design takes place in a workshop format, where a workshop typically takes between 2 hours (for an online workshop) to 1 full day (for some face-to-face workshops). Prior to the first workshop, a pre-Carpe Diem meeting takes place with all participants to inform everyone of what the process, determining a shared understanding of what is going to happen, who will be involved and why, and what the envisioned outcome of the workshop(s) is. Often, overall learning outcomes (e.g., ILOs) are also determined prior to the first design workshop. Phase 1 and 2 as described above can be included in the pre-Carpe Diem meeting. Sometimes it is necessary to first talk to the 'client' providing the assignment of a redesign to cover the aspects described under Phase 1.

A learning innovation consultant of the LIT creates an outline of the design workshop(s) and specifies the exercises guiding the design. It is advisable to regularly align with the client or business owner of the project to ensure a joint understanding of the outcomes and the process to get there, especially when a project is large and/or complex.

Table 3. Elements discussed during EIP Phase 3: Educational (re)design.

Phase 3 element	Questions include	Timing
Prerequisites (from Phase 1 and 2)	Who will participate in the design team? Who is the client and the business owner? What are the envisioned outcomes? Who will be facilitating the workshop(s)? How many workshops will be needed? (estimation)	4-2 weeks prior to first workshop
Workshop preparation	Which exercises fit the outcomes? Does the framework need to be aligned with the client? Do participants need to prepare something (e.g., reading)? Which materials are needed? E.g., flip-over, sticky notes, pens, Excel sheets, etc.	2 weeks prior to first workshop.
Workshop element 1: Create blueprint	What is the mission statement of the curriculum/course? How will Assurance of Learning (AoL) be guaranteed? What is the look and feel? What are the core didactical features? Course-level: Brown paper exercise to ensure alignment between ILOs, courses, and topics (curriculum level) or assessment and EGs (course level).	
Workshop element 2: Create storyboard	Brown paper exercise to determine: What is the storyline? What learning activities are needed? What learning resources are needed?	
Post-workshop	Which elements still need alignment? What are the next steps? Which further support is needed for implementation?	As soon as possible after the workshop.

Workshops are set-up using several exercises that require active participation of all members of the design team. As indicated, each workshop is set-up in accordance with the specified outcomes. Nonetheless, there are certain exercise templates that can be reused. For example, we often start a discussion about boundary conditions from a premise such as:

In five years, someone rushes up to you at a conference and says: "Oh hello, I remember you as one of my [programme or course name] professors!"

After which workshop participants are asked to answer questions like:

"Who is this person?" (this can be specified as e.g*., "What is this person's age/background/profession?"*)

"[Programme or course name] set this person to a fantastic path to the future because s/he learned…"

Answers are written down for later reference, e.g., using a flip-over or digital document.

A main workshop activity is a brown-paper mapping exercise where a large brown paper contains the empty timeline of a curriculum or course. Vertically, the paper contains columns for each time element (e.g., week, month, etc.). Horizontally, elements are different for curriculum and course design. When working online, the paper can be translated into a shared Excel sheet, for example in Google docs.

The brown paper of a course design session is horizontally divided into (from top to bottom): Topic, Learning Resource, Learning Activity, Assessment. As depicted in Table 3, the idea is to add elements to the appropriate place using sticky memos. First, the ILOs/EGs defined in Phase 2 are mapped to their appropriate moment in time, after which the appropriate assessments are placed to ensure the outcomes are reached. Afterward, the design team makes its way upward (or backward) to determine the learning activities that fit the assessment, and the learning resources needed to accommodate the learning activities.

The brown paper of a curriculum design session differs, based on the extent to which the shared understanding of what the curriculum should be have developed. When there is a shared understanding, a blueprint can be created using the categories (top to bottom) Topic/Course name, Resources, Learning Activities, and Assessment. Make sure to regularly check compatibility with the predefined ILOS and boundary conditions (target group, mode of delivery, etc.) as an activity. For the ISM-KA curriculum, we started doing a brainstorm using the categories "Course names" and "Themes and Topics" to create an initial outline of the curriculum. This process included a vote with all design team members on topics to include, exclude, or put on a reserve list (e.g., as a basis for potential elective courses). In a follow-up workshop, the team elaborated this into a larger brown paper containing the Timeline, Course names, Topics, Learning activities, and Assessment. See Figure 1 (p 10) for an example.

There is a constant temptation to start mapping content elements before the link between EGs/ILOs and assessment has been established, as for most people it feels more concrete to think in terms of content than in terms of EGs and how to assess them. Taking a content-focused approach entails certain risks like misaligning goals and assessments or delaying the progress by staying in comfortable discussions for too long.

Also, thinking about the workshop location or environment in advance helps to elicit the desired behaviour during the workshop itself. For example, active participation is easier to establish via a stand-up concept-mapping exercise using a brown paper than to discuss content while being seated at a large meeting table.

Finally, the latter two remarks indicate the importance of workshop facilitation. That is, at least one person should be responsible to make sure the desired output is reached by guiding the design team through the activities and by effectively managing the time. This often is not an easy task and it requires some practice. For larger or longer workshops, having two facilitators is advisable. Who will take on the task of facilitator needs to be decided in Phase 1. In our case, facilitation is done by a consultant from the LIT. When needed, a second LIT member can join the team to offer input from their specific expertise on didactics, educational technology, etc.

After a workshop, any paper output usually is digitalised and shared with all design team members and potential external stakeholders for feedback.

3.4. *Phase 4: Implementation and delivery*

During this phase, all the above is brought together into building the design. Here, the content experts are responsible for their own part (e.g. a course), when needed under the coordination of the programme owner. It

is very important to explicitly agree on roles and responsibilities. In some design trajectories, we experienced that the pace and guidance provided in the first three steps may lead to the assumption that the same will happen in the fourth. However, this is the time for content experts to take the lead. Of course, the process can still be paced and guided by a LIT consultant, but they cannot be responsible for the quality of the learning content or of the teaching.

Table 4. Elements of EIP Phase 4: Implementation of the curriculum and/or course(s).

Phase 4 element	*Questions include*
Preparation	Roles and responsibilities: Who will coordinate (which part)? Who will develop (which part of) the course material? What is the planning? How will roadblocks be managed?
Organisation and communication	Based on the agreed roles and responsibilities, agree on the best way to start development and implementation. The programme owner has overall responsibility. Teaching faculty is responsible for implementation on course level. LIT consultants provide didactic advice and facilitate the design process. When needed, they can perform coordination tasks but that should be explicitly agreed upon.

Table 5. Elements of EIP Phase 5: evaluation of the implementation.

Phase 5 element	*Questions include*
Preparation	Which aims and /or KPIs were set in Phase 1? Did any other questions rise during phases 1-4? Which (quantitative and qualitative) measurements are needed to answer the question? Can you already collect (benchmark) information? How will data be stored and processed? Is institutional ethical review needed? Who will be involved in the data collection and analysis? What will the output of this phase be?
Data collection	Is there a need to set up instruments (e.g., electronic survey system, interview protocol) or add questions to existing measurements (e.g., course evaluations)?
Data analysis	Which techniques are being used to analyse the data?
Reporting	How will the findings be reported?

Will results be publicly available?

3.5. Phase 5: Evaluation

In the fifth and final phase, measurements are set up to see if the aims and/or KPIs have been met. The latter have been defined in Phase 1 already. This means that some of the work relating to Phase 5 could (and should) already be done earlier in the cycle. This could for example include the collection of benchmark information (such as performance or retention of previous runs of an existing course) or selection of survey questions and setting up and electronic survey system. Sometimes, evaluations include measurements that ask for permissions from an ethics board and/or require writing specific background documentation for future reference (e.g., a data management plan or analysis protocol).
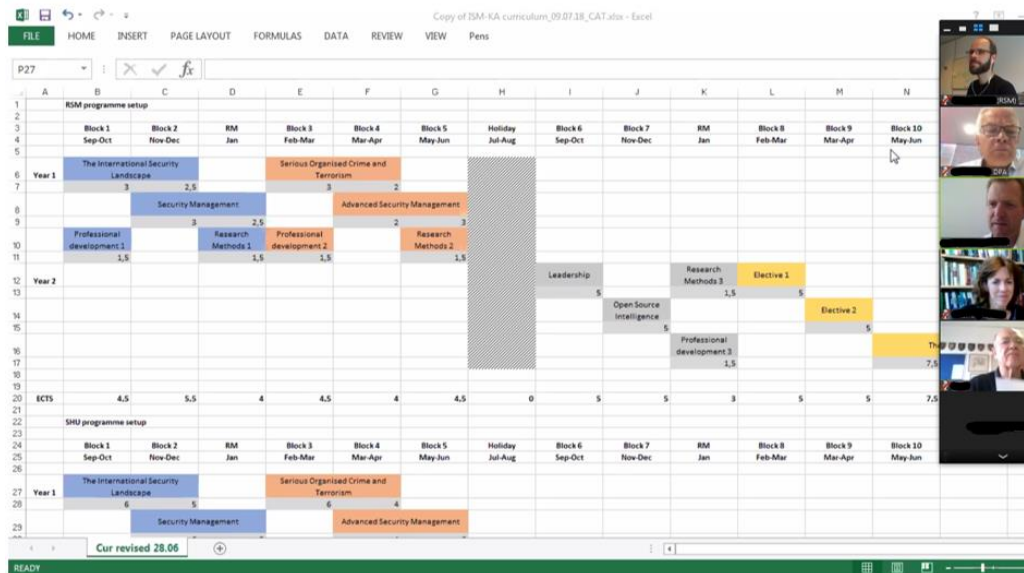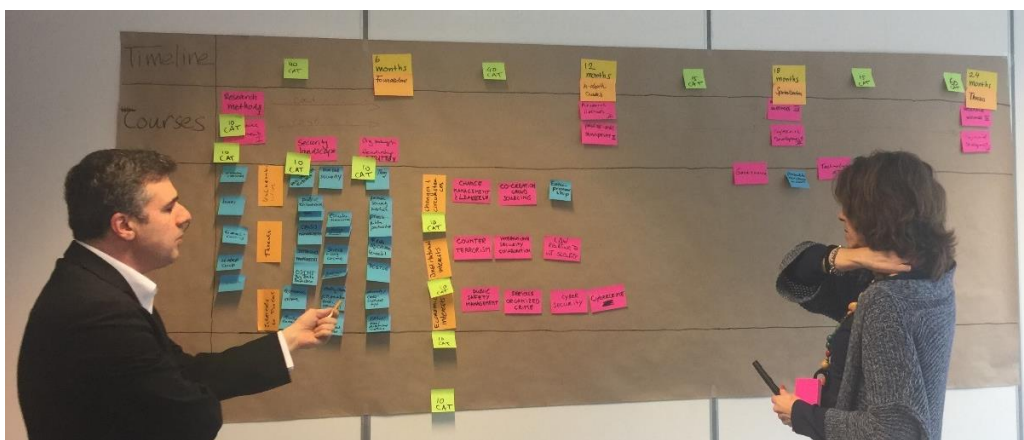

Figure 1. Examples of a face-to-face (top) and online (bottom) curriculum design workshop in progress.

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