Improving Education and Competences in Dietetics (IMPECD)

Work package O6: Syllabus for teachers

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1. The IMPECD project

Dietetics is a relatively young discipline at HEIs in Europe and differences in curriculum and thus education still exist. An example of the differences encountered is the “Dietetic Care Process” (DCP) or “Nutrition Care Process”, which is of key concern to all dietetic professionals. It is a systematic approach to recognize, diagnose and intervene in nutrition related health concerns. It improves consistency and quality of dietetic care and the predictability of outcomes, ensures evidence-based practice, and supports critical thinking as well as decision-making in all areas of dietetic practice.

Worldwide and within Europe different frameworks of DCPs are used e.g. differences in the number of steps or used terminology. Equally important, each step should be strengthened by evidence-based recommendations, which are still not available for Europe. Furthermore, not all countries use a standardized language in dietetics. Thus implementation of international research projects, comparability of project results, agreement of the most efficient therapies and cross border mobility for professionals is difficult.

Moreover, there is a substantial need for innovative learning materials. Different learning materials for the training of the various DCP are available, but unfortunately none use an innovative learning approach or are free for use. Therefore, another key output of this project is a Massive Open Online Course (MOOC) based on the unified framework DCP and free for use.

The project will be a role model for all of Europe and other HEIs will be encouraged to implement the unified framework DCP and the MOOC. IMPECD addresses also the Education and Training 2020 strategy of the EU. Health professionals need to be trained to use new technologies as well as to provide innovative means of health care aimed at improving patient care. Therefore a Strategic Partnership composed of five European institutions of higher education (HEI) has been formed to enhance the quality of dietetic education.

Project goals:

- unify the framework Dietetic Care Process (DCP)
- produce a Massive Open Online Course (MOOC), free for use
- implement two Intensive Study Programs (ISP) to test the MOOC and evaluate the materials
- set up a syllabus and implementation guidelines to disseminate the results
- improving quality and relevance of dietetic higher education in Europe
- improving key competences including English language, digital competences, knowledge and understanding of dietetics, dietetic process as well as professional reasoning
- building professional relationships, autonomy and accountability
- research and development in dietetics and thereby increasing employability
- support discussions concerning a dietetic standardized language
- support Life Long Learning for dietitians

Output of the project include a unified framework DCP, as a basis for the development of clinical cases, and the production of the innovative MOOC, which is embedded in the IMPECD-platform and available 3 years after the

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project has ended (August 2018) until August 2021. Furthermore, pedagogical training materials are developed to present the clinical cases on the MOOC and for the development of the contents of the two ISPs. This syllabus was compiled and addresses the other European universities as a guideline to implement the mentioned results within the curriculum. To disseminate the results as a role model for Europe, implementation guidelines are compiled as a discussion basis for the stakeholders. These results will support the development of a unified framework DCP and the discussions about the implementation of a standardized language in the field of dietetics. Furthermore, quality and relevance dietetic higher education improves and Life Long Learning will be supported and serves as basis of excellent dietetic therapy in all of whole Europe, which lead to cost savings in the health care sector.

2. Syllabus

The term 'syllabus' is used following this definition:

"A syllabus is a guide to a course and what will be expected of you in the course. Generally it will include course policies, rules and regulations, required texts, and a schedule of assignments. A syllabus can tell you nearly everything you need to know about how a course will be run and what will be expected of you. " (https://undergrad.stanford.edu/advising/student-guides/what-syllabus)

The target group of this syllabus are HEIs interested in using or implementing the described MOOC within their curriculum. This syllabus is a direct outcome of the IMPECD project, and offers a guide for actual and future users of the developed course. Our target group are HEIs offering dietetic courses. The first chapters deal with the background of important aspects within the course: course type, case studies, competences and learning outcomes, reflection and portfolio. This information is included as our survey among dietitians and HEIs demonstrated that not everyone is familiar with these concepts, as described in chapter 7. The final chapter gives suggestions and opportunities for HEIs to use and/or implement the IMPECD course in their curriculum.

For those universities/programmes who are very familiar with the concept described in this syllabus, or if you mainly want to have an idea of how the MOOC could fit your educational purposes, it could be useful to go directly to chapter 8 of this syllabus.

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3. Massive Open Online Course (MOOC)?

MOOCs (= Massive Open Online Courses), as a new form of online courses, became popular in 2011 based on the enormous success of the MOOC ""Artifical Intelligence" by Sebastian Thrun (Stanford University). In this MOOC participated 160.000 people (Ebner, Kopp, Wittke, & Schön, 2015). However, the very first MOOC was offered by George Siemens and Stephen Downes in 2008: „Connectivism and Connective Knowledge (CCK08)" (McAuley, Stewart, Siemens, & Cormier, 2010).

The European Commission defines a MOOC as an online course open to anyone without restrictions (free of charge and without a limit to attendance), usually structured around a set of learning goals in an area of study, which often runs over a specific period of time (with a beginning and end date) on an online platform which allows interactive possibilities (between peers or between students and instructors) that facilitate the creation of a learning community (Liyanagunawardena, & Williams, 2014).

There are different types of MOOCs. The "x" in xMOOCs stands for eXtension, this type is similar to traditional lectures at universities (Ebner, Kopp, Wittke, & Schön, 2015). The "c" in cMOOCs stands for "connectivism", the new learning theory of the digital age by George Siemens. Within this type, the participants define themselves the learning goals during the course and participants provide all learning materials as well (Wedekind, 2013). The bMOOC ("b" - "blended") is the connection between traditional lectures and online participants, where advantages and disadvantages of xMOOCs and cMOOCs are best compensated (Yousef, Chatti, Schroeder, & Wosnitza, 2015). The MOOC within the IMPECD-project is designed as a bMOOC because it is connected with lectures at the participating HEIs.

Generally, MOOCs are offered through existing web-based platforms and in cooperation with universities. MOOCs include videos, various resources, assignments, and assessment for a specific period. MOOCs could bring information to a bigger audience and might be a way to reduce costs of higher education. Limitation of these learning tools are partly inconsistent quality, low completion rates, and limited research on their effectiveness (see Table 1) (Stark & Pope, 2014).

Table 1: Pros and cons of MOOCs for participants and instructors (adopted from Stark & Pope, 2014)

Pros	**Cons**
For MOOC-participants	**For MOOC-participants**
• Free, open to all, everybody can enroll without obligation to participate	• Academic and continuing professional education credit rarely offered
• Wide range of topics are available from several universities around the world	• Many courses only offered during specific time frames
• Course interactions reflect a global student body	• Little or no direct interaction with MOOC-instructor
For MOOC-instructors / developers / teachers	**For MOOC-instructors / developers / teachers**
• Same effort can reach (ten) thousands around the world	• Time-consuming and expensive to produce with limited return on costs

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• Repeat sessions less costly and time-intensive to deliver	• Delivery requires access to a MOOC consortium or other platform
• Course materials can be used to augment face-to-face instruction	• Little or no direct interaction with students and low completion rates
• Experience can enhance reputation and teaching skills	• Limited research to date on effectiveness of MOOCs to promote learning

Although technical and pedagogical aspects are in the early stages of investigation (Liyanagunawardena, & Williams, 2014), MOOCs have the potential to address challenges of the health care education e.g. development of appropriate clinical reasoning skills (Mehta, Hull, Young, & Stoller, 2013). Although several MOOCs exists in the field of nutrition and dietetics, they cover quite general topics and none of these focuses on a task-centered approach of treating clinical cases by applying the Dietetic Care Process (Raffetseder, 2016).

What is the IMPECD MOOC?

Based on these data, the IMPECD-project aims to develop a MOOC for practicing the Dietetic Care Process bases on clinical cases. Because it is connected with lectures at the participated HEIs it is a bMOOC.
The development of the IMPECD bMOOC as interactive learning approach to foster evidence based work in dietetics and to support international collaboration is unique and innovative in the field of dietetics. Students are guided in the IMPECD MOOC to base their work in the clinical cases on the framework DCP to increase quality in care. Students are trained in clinical reasoning and critical thinking by using an interactive method, without necessarily needing access to practice placements and patients.
All universities participating in the IMPECD-project are responsible for generating and updating content for the IMPECD bMOOC. It will supported technically by St. Pölten University of Applied Sciences.
The IMPECD bMOOC runs via a Moodle© platform because Moodle© is a cost-free and open solution, a lot of universities use Moodle© already, Moodle© offers a broad variety of tools and it is possible to connect it to other technical tools.
The IMPECD bMOOC will be accessible for everyone and provide following courses: Introduction, Dietetic Care Process and different clinical cases. Actually, clinical cases dealing with the topics Gestational Diabetes & Chronical Kidney Disease, Cardiovascular Disease & Type 2 Diabetes, Colorectal Cancer & Metastases/Refeeding Syndrome/Malnutrition/Enteral (Tube) Feeding, Obesity & Bariatric Surgery, and Gastrointestinal Symptoms are implemented in the bMOOC. Although the bMOOC is accessible for the whole year, the case developers offer guidance during a specified schedule.

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Table 2: Schedule IMPECD bMOOC

Month			March				April					May			Nov.				Dec.	
Calendar week			9	10	11	12	13	14	15	16	17	18	19		44	45	46	47	48	49
Course topic	**Responsible HEI**																			
Introduction, Dietetic Care Process	All partners		■	■																
Gestational Diabetes & Chronical Kidney Disease	Antwerp				■	■											■	■		
Cardiovascular Disease & Type 2 Diabetes	St. Pölten									■	■									
Gastrointestinal Symptoms	Fulda											■	■							
Obesity & Bariatric Surgery	Neubrandenburg														■	■				
Colorectal Cancer & Metastases / Refeeding Syndrome / Malnutrition / Enteral (Tube) Feeding	Groningen																		■	■

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Interested users can register themselves for the bMOOC via http://mooc.fhstp.ac.at/ (see Figure 1). Users can choose between two options:

- Users can participate during the defined time schedule. During that time the bMOOC is guided via the case developers e.g. in the discussion forum.
- Users can go themselves through the bMOOC independently from the time schedule. During that time the bMOOC is not guided.

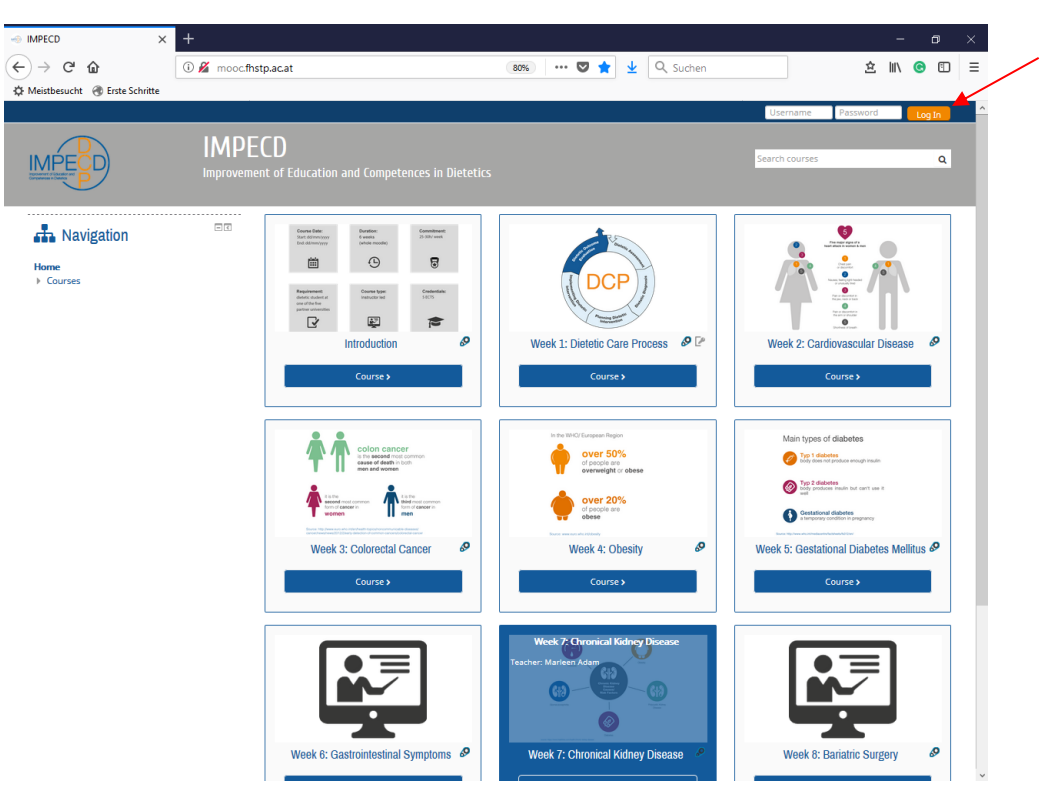

Figure 1: Landing page of the IMPECD bMOOC

After registration, users start with the introduction course. In this course, the learners get all information concerning the IMPECD-project and the bMOOC itself. Afterwards, learners are guided through the DCP-course as well as through the clinical cases (see Table 2: Schedule IMPECD bMOOC). The case developers are responsible for the quality of the cases as well as for the guidance of the learners during their case within the defined time schedule. This approach ensures a high quality learning process and international collaboration between students of participating HEIs while working on the clinical cases.
Students from the participating HEIs and students from other HEIs will use the bMOOC slightly different. These differences are summarized in the following table:

Table 3: Differences between students of participating and non-participating HEIs concerning the IMPECD bMOOC

	Students of participating HEIs	**Students of non-participating HEIs**
Blended approaches possible (bMOOC)	Yes, because the cases of the bMOOC are connected to in-class-lectures.	No, because they can attend the online course but not the related in-class-lectures.
Commitment	mandatory	not mandatory

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Grading	part of the in-class-lectures grading	Get a certificate of attendance after participation of the whole bMOOC.
Formation of groups	Equal distribution of different countries students within the students groups working online together.	Can participate in every group if OK for all group members.

Besides the introduction course, all courses consist of a general page and the clinical case itself. On the general page, learners find basic information as well as learning materials concerning the topic of the clinical case, the related learning outcomes and collaborative tools like a discussion forum.

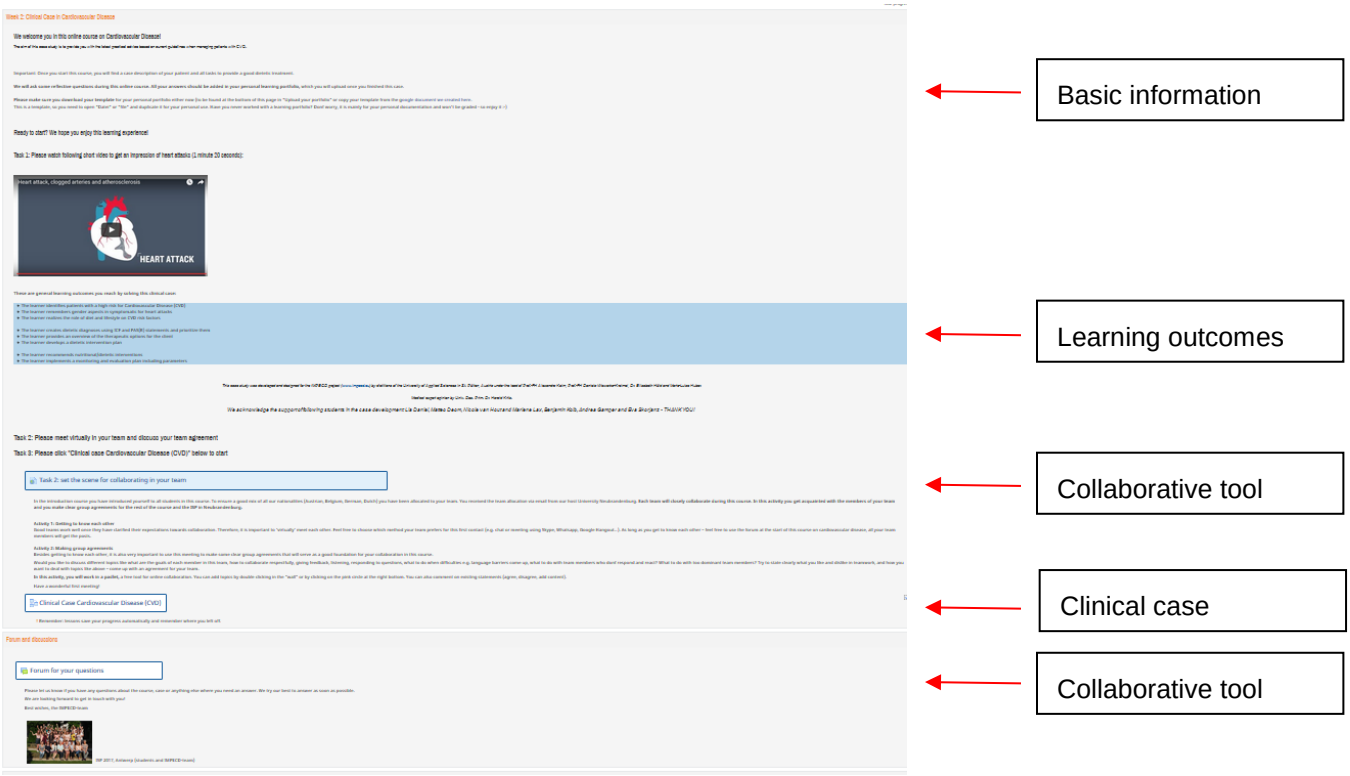

Figure 2: Structure of a clinical case in the IMPECD bMOOC

Each clinical case follows the steps of the Dietetic Care Process and participating students learn and reflect while going through it. Besides case-related content, participants find 15 evaluation questions in every clinical case. These questions are part of grading, while progress question keep the clinical case going and reflection question are for the learners reflection on their progress.

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4. Development of a clinical case

In total, nine clinical case were developed for several common diseases: gestational diabetes, kidney disease, coronary heart disease and type 2 diabetes, obesity and bariatric surgery, gastrointestinal symptoms, colon cancer and malnutrition. Development of the clinical cases were based in the unified framework of the IMPECD-Dietetic Care Process (DCP) with the five steps of Nutrition Assessment, Dietetic Diagnosis, Planning Dietetic Intervention, Implementating Dietetic Intervention, Dietetic Monitoring and Outcome Evaluation (link website IMPECD-DCP). All clinical cases were implemented in the IMPECDMOOC, which is used as a training material for students, and people in the specific working field to keep their knowledge and skills up to date. For a uniform development, it was necessary to establish guidelines (can be found on the IMPECD website) for generating the clinical cases based on the unified framework DCP and the requirements of the MOOC. In those practical guidelines on the requirements, structure, and learning outcomes of the clinical cases, a standardized format for the development of a clinical case, and a format for the solution of the clinical case are pointed out.
The development of the cases were (peer)reviewed in order to guarantee the quality and content of the cases. If possible, experts in the various working fields reviewed the clinical cases. In any case study, a medical doctor or another professional within the field of practice the case is related to, will be involved in the reviewing process of the clinical cases. Those experts will check the following: medical procedures, medically related guidelines, medications, and steps of the medical treatment.
The clinical case should meet the following requirements:

- The clinical case should be evidence-based and practice-based;
- Related guidelines need to be in English language;
- The clinical case follows the steps and terminology of the unified framework DCP;
- The clinical case should be formulated clearly and shortly with suitable learning outcomes according to the Pyramid of Miller (Taylor DCM & Hamdy H, 2013, see criteria for LOs);
- Generic names for medication (EMA, 2016) (no brand names but chemical names; e.g.: no Aspirin but acetylsalicylic acid) should be used;
- Calculation of dietary intake is depending on the content of the clinical case and the calculated data should be provided in the clinical case.
- The information in the clinical case should stay up to date to the latest European guidelines.
- The case should fit within the (technical) possibilities of the MOOC.

The overall aims considering the cases within IMPECD are to:

- create a set of clinical cases with different routes, different topics and therefore several learning perspectives (see figure 1);
- provide enough information during the clinical case;

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- evaluate the progress of the learner considering content of the clinical case and IMPECD-DCP steps
- let the learner reflect on the progress.

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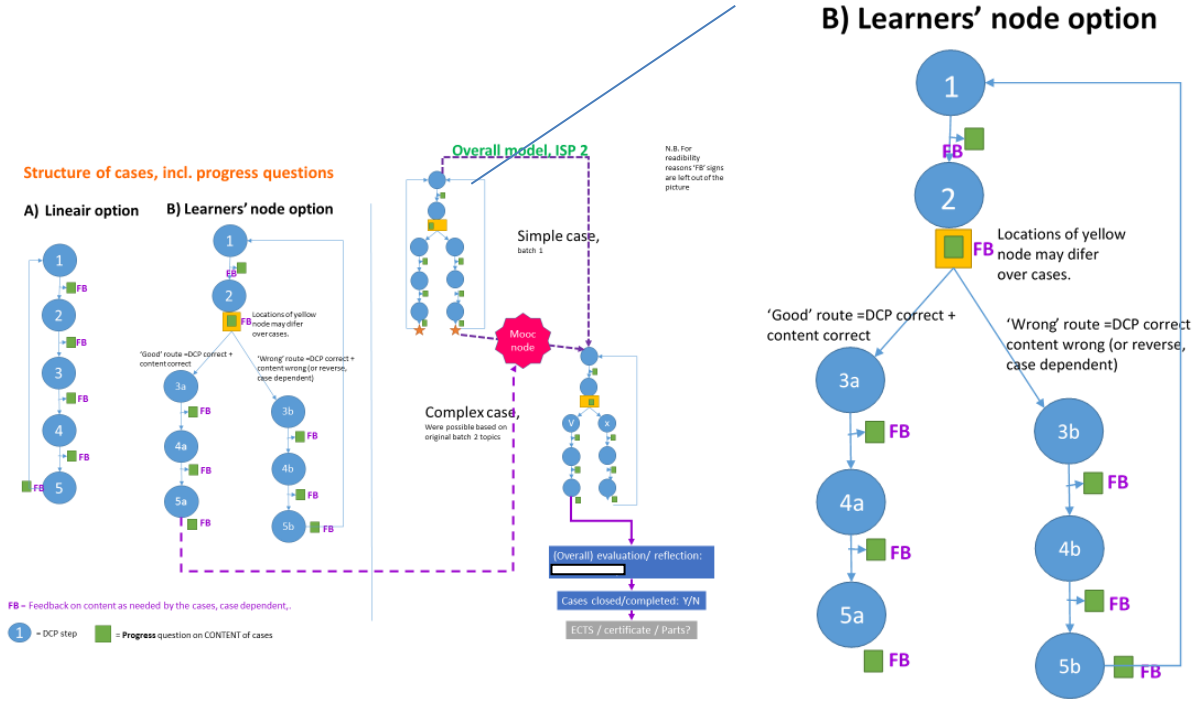

Figure 1. Example of a flow diagram of the structure of a clinical case.

The decision nodes are depicted with the yellow square in figure 1. Case developers should decide at what point in the routing a good/wrong decision node is wanted. Due to the design this can happen after each step.

While further developing the case, the following requirements should be fulfilled with respect to the structure of the case as explained before.

- All five steps of the IMPECD- DCP should be used to solve the clinical case;
- The scenario develops according to the learners' answers to the **progress questions**.
- The case developers decide where the good/wrong decision node is added to the case.
- Feedback is provided on the content, after each DCP-step / according to the wishes of the case developers.
- Use a maximum of one decision node in the clinical case. Hence, develop two routes:
    - a 'good route' (correct answer on progress question(s))
    - a 'wrong route' (incorrect answer on progress question(s)).
- Make the clinical case sufficiently challenging (i.e. sufficiently difficult) to stimulate critical thinking and discussion;

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Within the right flow chart:

FB = After each DCP step the learner will receive feedback (FB) based on the progress questions on **content**

 Progress question base on content

The green squares represent the PROGRESS QUESTION. This question and its answer are needed to go to the next step as the case develops. Make sure that the answer scales are kept as simple as possible (the more options the more routes).

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5. Competences, learning outcomes and evaluation - background

The EFAD report: 'Revised Dietetic Competence and the six domains of dietetic competency in Europe' explains what competency-based education means. The didactic aspects of IMPECD are based on this model.

Competency-based education
Competency-based education is an approach which is organized around competencies. Competencies are expressed as learning outcomes and the individual will submit evidence to demonstrate that they have met the outcome/competencies in each domain of dietetics.

As the focus is on outcome, the process of producing the evidence becomes very important and should be less dependent on the environment, and instead more flexible and learner centred. The learner becomes more accountable to provide the evidence. As accountability for professional performance is expected of all healthcare professionals, using a student form of competency based assessment is a very useful introduction to the process of continuing professional development (CPD). Self-assessment will be used after admission to the profession when the qualified dietitians undertake their Lifelong Learning (LLL) (Efad, 2016).

Competency domains
Competency is defined as "an observable (measureable) ability… integrating knowledge, skills, values and attitudes". Competency can therefore be measured using appropriate assessment tools as an „outcome measure" during and after academic and practice-based education.

Development of the IMPECD competences

The IMPECD competences were developed using:

- the current competences in our dietetic programmes, connect to different professional fields (preventive, curative) and to intra- and interindividual competences
- the EFAD competences (2017)
- the 'Interprofessional Collaboration In Healthcare (IPCIHC) - module'. This study program from the Antwerp University Association (AUHA) was inspirational for creating competences for the IMPECD-project.

EFAD has developed an academic curriculum for student dietitians across Europe, structured to align with the six 'domains' of EFAD Competencies of the Graduate Dietitian (2016). This recognises that student dietitians must achieve all competencies to be able to qualify as a 'registered/authorised' dietitian (EFAD, 2017). To be a competent dietitian in Europe you must show that you are a healthcare professional and have competencies in the following six domains (five of which are dietetic profession specific) (EFAD, 2017):

EFAD six domains of dietetic competency (2017), see also Figure 1.1:

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1. Healthcare professionalism

Dietitians are healthcare professionals practicing/offering safe and effective healthcare; they do no harm

2. Knowledge base of dietetics

The scientific knowledge that dietitians draw upon to inform their practice is used in a unique and profession specific way

3. Dietetic process and reasoning skills

The application of a dietitians knowledge, skills and attitudes is applied in a systematic and effective way for a safe health outcome

4. Evidence base of dietetics

Dietitians appraise and justify their food and nutrition interventions based on evidence and commit to enhancing evidence effective healthcare

5. Autonomy, accountability and quality in dietetic practice

Dietitians recognise that they are accountable for their actions and practice autonomously ensuring quality of their practice care

6. Communication, relationship and partnership skills in dietetics

Dietitians advise, counsel and teach in multisector environments adapting to societal and health needs about food and nutrition

In the EFAD report there is also a topic about Curriculum Delivery. Especially for the IMPECD project it is interesting that other varieties of teaching are included. The IMPECD-project is another variety to learn. Teaching and learning should be supported with a diverse variety of teaching methods to meet learning objectives (EFAD, 2017).

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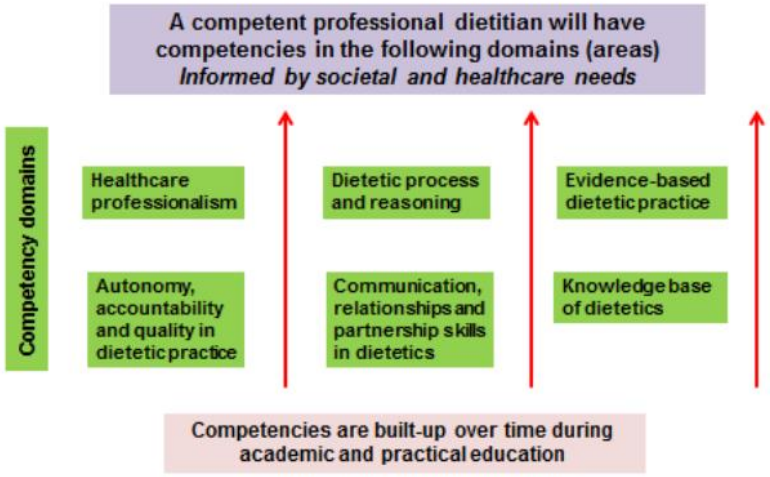

Figure 0.1: Competency domains contributing to a competent professional dietitian (EFAD, 2017)

Together, these six domains are demonstrated at the point of entry into the profession in a new but competent dietetic practitioner. These six domains are also the baseline/threshold competencies for all dietetic practitioners after qualification during their professional careers in dietetics (EFAD, 2017).
Building up and mastering competency must be done stepwise. Therefore, to achieve a competency domain, each domain needs to be broken down into individual learning outcomes and measured (EFAD, 2017).

In the model **'Interprofessional Collaboration In Healthcare (IPCIHC)** – module, the students learn to work in a multidisciplinary team. During one week the student dietitians work together with other students in health care for example students in Medicine, physiotherapists, nurses, students in psychology,… Each team has to work out a case and they have to work together. This is a very intense week and the students have to solve the case, do lots of reflections and have to fill in a peer assessment. There are 7 main topics:

1. Expert
2. Communicator
3. Teamplayer
4. Manager
5. Stakeholder (promotes the interests of each team member)
6. Lifelong learning
7. Professional

These insights were synthesized in the following IMPECD competence model, consisting of five competences and a visual representation in the IMPECD flower

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The five IMPECD competences

1. Methodological practitioner

The learner follows a specific method learned in the education program and when going through the MOOC for example the DCP-model, motivational interviewing, stages of changes, PASR statements, the ICF-model,… The learner works systematic and in an effective way. The learner sets measurable targets, collects and interprets relevant data, selects methods and tools innovative to solve unknown complex problems.

2. Knowledge of Dietetics (Diet expert)

The learner is an expert: he owns the necessary knowledge of human nutrition and dietetics, owns the necessary knowledge of food and food services, masters the theories of behaviour change and behind changing eating behaviours. He applies this knowledge in developing and implementing a client centred (individuals, groups, community or population) intervention plan and follows – up the intervention by monitoring and evaluation and if necessary in collaboration with other health care workers.

3. Evidence based practitioner

The learner has a critical attitude, he works in a result-oriented manner. The learner makes careful decisions that are as evidence-based as possible and based on their own knowledge and practical experiences that are focused on the wishes and needs of the client. He always uses evidence based guidelines to give the client the best advice. The scientific knowledge is translated to an unique and professional advice for the client. The learner appraises and justifies the food and nutrition interventions based on evidence. He acts with a focus on the critical appraisal of literature and research, to ensure the dietetic intervention remains current and relevant.

4. Reflection & critical thinking

The lifelong learner acquires the necessary knowledge and skills to enable professional tasks in a rapidly changing society. He owns the capacity for critical (self)reflection. After an experience the learner reflects the moment, he pro-actively takes a critical approach to own learning and sets goals and targets for Lifelong Learning (EFAD, 2017). The learner recognise that he is accountable for his actions and practice autonomously ensuring quality of his practice care. The learner does not just takes something for granted, he has the individual capacity to think clear, rational, open-minded and informed by evidence. After a reflection the learner has a growth mindset and has a lifelong learning attitude.

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5. Lifelong learning

The learner has a lifelong learning attitude: he develops further expertise in knowledge, skills and attitude by consulting scientific literature, exploring new / other methodologies or technologies and following extra training. He continuously reflects and evaluates own skills and practice and implements a plan to improve competency goals.

The IMPECD competence flower

Each competence has a competence level. These levels or layers of the flower are based on the Pyramid of Miller. The first layer is about the level ‘knows’. The learner shows if he has knowledge about a competence. For example the learner identifies the ranges of the lab data. The second layer stands for the level ‘knows how’. The learner shows ‘how he uses the knowledge’. An example is the learner analyses the blood glucose level before and after a meal. The third layer is ‘shows’ and in this level the learner shows how he applies the knowledge. An example is the learner evaluates the treatment of the case.
In the pyramid of Miller there is also a fourth layer ‘do’, this stands for applying the knowledge in practice. This is applied in the MOOC on the moment where the student observes a real consultation. But most of the time the last layer is used during an internship instead of watching a movie. The first three layers are included in the flower.
There is one competence that’s evaluated differently. The competence: Knowledge of dietetics. The main goal of going through the MOOC is to upgrade the level of knowledge in dietetics. After each case the student learns more about a different disease and the link between the disease and the food recommendation.

The ‘final’ flower (see next page):

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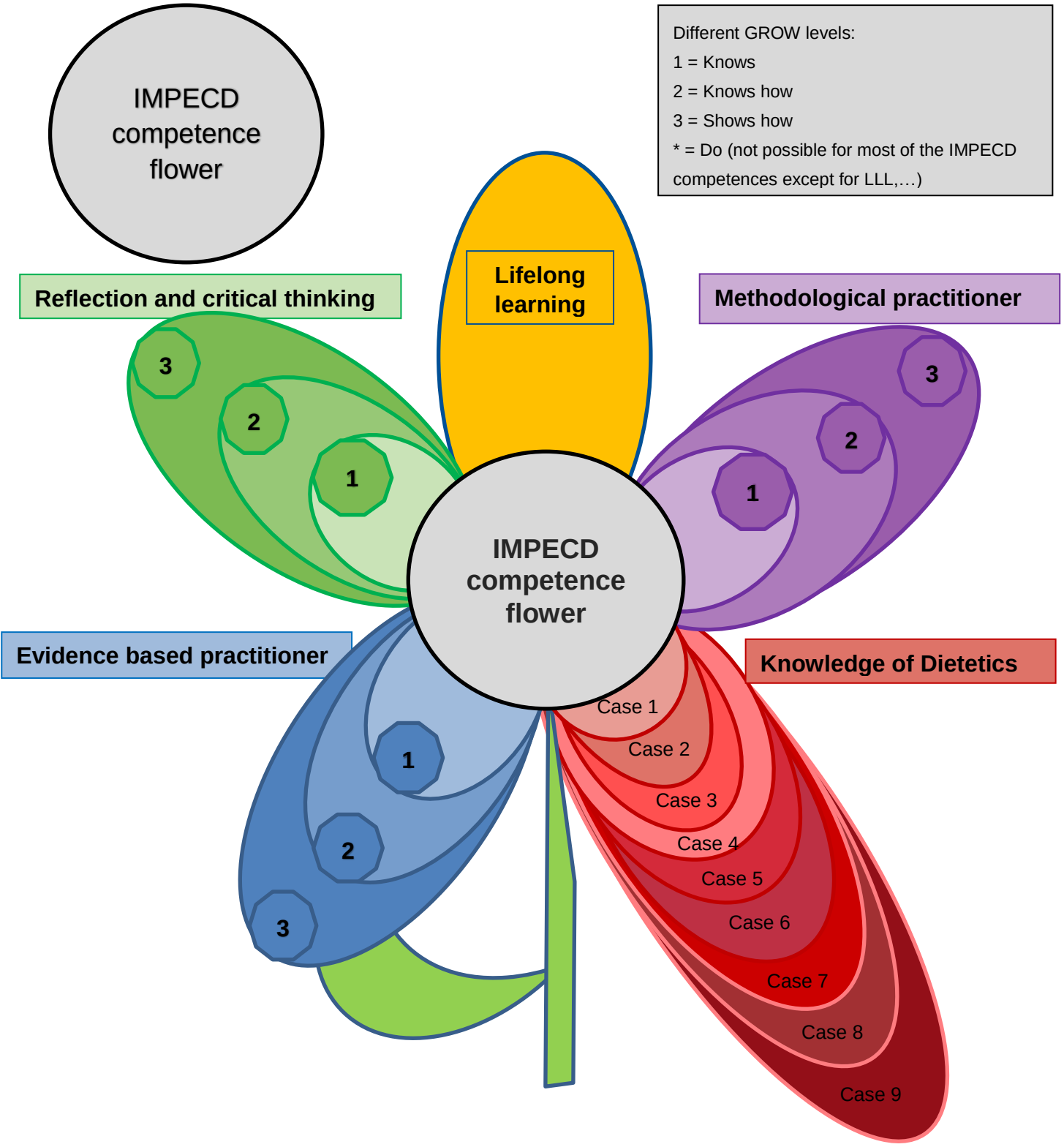

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Learning outcomes

In the EFAD report of 2016 a learning outcome (LO) is defined as: “a statement of what a learner is expected to know, understand and/or be able to demonstrate after completion of learning. They can refer to a single course unit or module or else to a period of studies, for example, a first or a second cycle programme. Learning outcomes specify the requirements for award of credit. Learning outcomes are devised by academic staff and practice teachers.”

In the IMPECD-project each case developer has created learning outcomes for each case. These learning outcomes are linked to one of the five IMPECD competences. For each LO evaluation question were created, given the ability to check to what extent LOs are achieved by the learner.

Each case has 5 DCP steps to go through.:

- Step 1: Dietetic assessment
- Step 2: Dietetic diagnosis
- Step 3: Planning dietetic intervention
- Step 4: Implementing dietetic intervention
- Step 5: Dietetic outcome evaluation

Each partner formulated for each step of the DCP three learning outcomes (one of each level, except for the level “do”) and in a SMART way (Specific, Measurable, Achievable, Realistic and Time Based).

Below there is a table based on Bloom’s taxonomy with verbs that can help to create learning outcomes. The most important thing is that the verbs are ‘operational’ in that they refer to student activities that can be observed and evaluated.

Level (Pyramid of Miller)	**Explanation of the level**	**Verbs - examples**
Knows	Knowledge	classify, categorize, identify, remember, putting in the right order, mention, localize, repeat, call, reproduce, list, describe, identify, mention, classify, select, differentiate, indicate, define, distinguish, describe, declare, characterize, typify, formulate, …
Knows how	Applying knowledge and understanding	explain (how), construct, calculate, apply, use, manage, execute, demonstrate, do, shape, show, present, modify, complete, analyse, find out, examine, compare, justify, divide, organize, conclude, …
Shows How	integration of knowledge, understanding, skills and attitudes	represent, negotiate, direct, lead, instruct, implement collimation, determine, create, introduce, change, recommend, complete, optimize, give a vision, (critical) review, comment verify, improve, …
Do		Portfolio, performance on the work floor

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Example of General Learning outcomes

A comprehensive overview of all learning outcomes of the IMPECD project can be found in Appendix 1.

Step 1: Dietetic assessment
LO 1 (knows): the learner describes the components of the dietetic assessment
LO 2 (Knows how): the learner calculates the BMI of the client
LO 3 (Shows how): the learner evaluates the clinical status

Step 2: Dietetic diagnosis
LO 1 (knows): the learner identifies the PAS(R) statements
LO 2 (Knows how): the learner defines the construct of the ICF model to categorize all the symptoms that lead to the dietetic diagnosis
LO 3 (Shows how): the learner formalises the dietetic diagnosis based on the PAS(R) statements

Step 3: Planning dietetic intervention
LO 1 (knows): the learner mentions the main points and the side issues of the planning of the intervention
LO 2 (Knows how): the learner motivates the main points of the dietetic intervention
LO 3 (Shows how): the learner provides within the intervention long-term plans

Step 4: Implementing dietetic intervention
LO 1 (knows): the learner identifies the right dietetic tool to educate the client about the intervention
LO 2 (Knows how): the learner shows which other professionals could be included in the care of the client
LO 3 (Shows how): the learner thinks about how he/she wants to monitor the intervention plan

Step 5: Dietetic monitoring and evaluation
LO 1 (knows): the learner lists all the components that he wants to monitor
LO 2 (Knows how): the learner makes a conclusion of the measure outcomes
LO 3 (Shows how): the learner formalises the positive and negative outcomes

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Evaluation questions

Each case contains an evaluation question for one learning outcome. In total there are at least 15 learning outcomes and 15 evaluation questions.

CASE X

DCP: Step 1	Learning outcome level 1: knows) Learning outcome level 2: knows how Learning outcome level 3: shows	Evaluation question 1 (link with LO1) Evaluation question 2 (link with LO2) Evaluation question 3 (link with LO3)
DCP: Step 2	Learning outcome level 1: knows) Learning outcome level 2: knows how Learning outcome level 3: shows	Evaluation question 1 (link with LO1) Evaluation question 2 (link with LO2) Evaluation question 3 (link with LO3)
DCP: Step 3	Learning outcome level 1: knows) Learning outcome level 2: knows how Learning outcome level 3: shows	Evaluation question 1 (link with LO1) Evaluation question 2 (link with LO2) Evaluation question 3 (link with LO3)
DCP: Step 4	Learning outcome level 1: knows) Learning outcome level 2: knows how Learning outcome level 3: shows	Evaluation question 1 (link with LO1) Evaluation question 2 (link with LO2) Evaluation question 3 (link with LO3)
DCP: Step 5	Learning outcome level 1: knows) Learning outcome level 2: knows how Learning outcome level 3: shows	Evaluation question 1 (link with LO1) Evaluation question 2 (link with LO2) Evaluation question 3 (link with LO3)

Example evaluation question

LO: the student can describe the medical diagnosis of gestational diabetes
Evaluation question: Which test is needed to diagnose gestational diabetes?
Answers (multiple choices):

- fasting glucose > 126 mg/dl
- oral glucose tolerance test (75mg)*
- high glycemic postprandial > 250 mg/dl
- HbA1c > 8% (63 mmol/mol)

*right answer

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Achieving the IMPECD competences: the matrix

LOs linked to the competences 'Methodological practitioner', 'Knowledge of dietetics' and 'Evidence based practitioner' are very common in all the cases. By going through each case the learner needs to work in a methodologically way, knowledge in dietetics is needed and also the student learns a lot about how to work evidence based. The other two competences four and five need more explanation:

- Reflection and critical thinking

The learner does not just takes something for granted, he has the individual capacity to think clear, rational, open-minded and informed by evidence. The LO's created by the case developers are mostly focused on critical thinking. The learner has a portfolio to fulfil. He makes several reflections (see PART 2: deep reflection, short reflection, short reflection after the wrong choice and general reflection) during each case. The learner keeps up these reflections in his portfolio. We can assume that when the learner fulfils his portfolio the competence of reflection is achieved.

- Lifelong learning

In the IMPECD project there are different levels of growth. These levels are based on the pyramid of Miller. Going through the whole MOOC and solving all the cases the level 'do' is achieved. This is the fourth level of the pyramid of Miller. The learner is actually 'doing', he is learning in an active way and shows that he has an attitude of lifelong learning.
In this MOOC the competence of lifelong learning is achieved by solving the cases overall, there are also specific tasks such as watching a video, reading the guidelines, completing an ICF-model, working with the PASR statements…The learner has already a good level of knowledge of dietetics on a national level. By going through this MOOC the learner gets the opportunity to work with other students, to discuss problems, diagnoses and the treatment of the client on an European level. Also the English language can be improved by completing the IMPECD MOOC.
Another very important part in this MOOC is the reflection part. This is the students portfolio. Here the students reflects on his own learning process and he has the opportunity to become a critical thinker. At the end of the MOOC the leaf of the competence lifelong learning is colored.

In conclusion there are two learning outcomes for the competence of Lifelong learning:

- The learner fulfils the IMPECD MOOC by going through all the cases.
- The learner completes his own portfolio.

To link the created LO's to the competences the didactic developers created a matrix to visualize the growth of the competences during the MOOC. The growth of the flower is indicated in Appendix 1 by use of different colours.

The first step is going through the DCP-MOOC. After this step the first leaf of methodological practitioner is colored, all the other leafs are uncolored. At the end of the MOOC when all the cases are completed all / almost all the competences are achieved.

6. Reflection in education and professional development - background

The profile of a dietitian mentions “the ability to reflect on dietetic experiences and demonstrate reflection in action” (ref: European Academic and Practitioner Standards For Dietetics. EFAD, 2005)

What is professional reflection?

Reflection has to do with thinking about yourself, the way you handle things,… A mirror is used to reflect and look back at your own experiences and actions, to learn and act better in the future. As Calderhead and Gates (1993) already stated many years ago, the essence of reflection is that it enables professionals “to analyse, discuss, evaluate and change their own practice”. Indeed, in the work of practitioners, reflection is always linked to practice. In almost all approaches to reflection, one can distinguish a mutual relation between reflection and practice as depicted in Figure 1, a relation that is cyclic, because through reflection one develops new insights that help to improve one’s behaviour in practice, behaviour that can in turn be reflected on, etcetera (Korthagen & Vasalos, 2009).

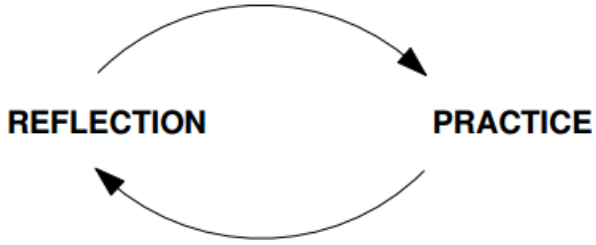


Figure 3: The cyclic relation between practice and reflection (Korthagen & Vasalos, 2009)

Korthagen (1982, 1985) published an adaptation of the model of Kolb and Fry, which has since been used in many teacher education programs throughout the world. Figure 2 shows the ALACT model, which aims at structuring reflection. It is named after the first letters of the five phases (Korthagen & Vasalos, 2005). This model describes the ideal process of learning in and from practice with the aid of five phases: (1) Action, (2) Looking back on the action, (3) Awareness of essential aspects, (4) Creating alternative methods of action, and (5) Trial, which itself is a new action and thus the starting point of a new cycle.

Over many years shifts took place and reflection of practitioners can be deepened to Core Reflection (Korthagen & Vasalos, 2009). A focus on strengths alone is not sufficient, but that what is needed is cognitive, emotional and motivational awareness of both one’s strengths, and of one’s *inner* obstacles to the actualization of one’s strengths (Korthagen, 2001b; Korthagen & Vasalos, 2005). The summarize of the development is represented in Figure 2.

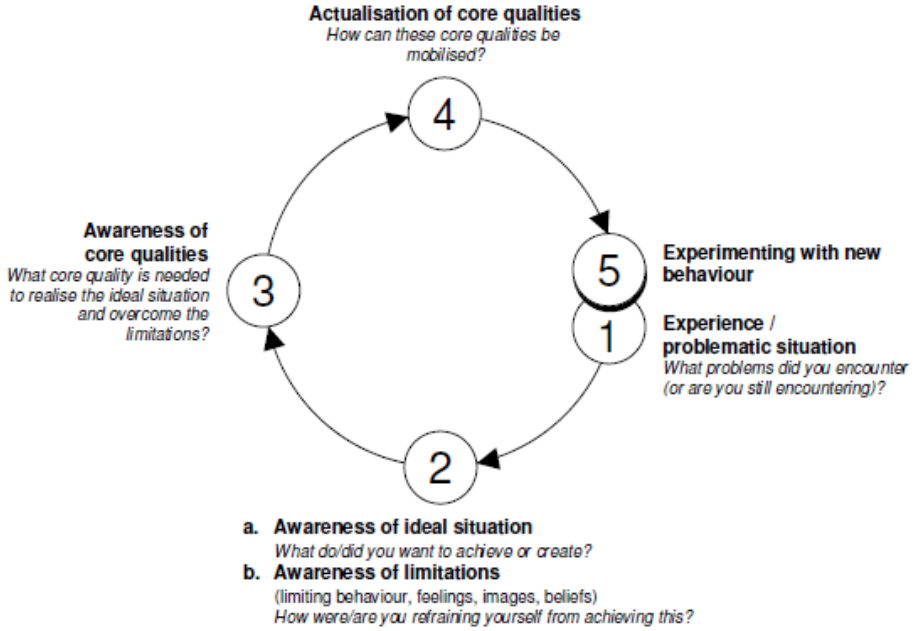


Figure 4: Phase model of Core Reflection (Korthagen & Vasalos, 2005)

What we are talking about here is the important shift from looking back on a situation to becoming aware of one's ideal and one's core qualities connected to it, which helps to create more professional fulfilment, and "vocational vitality". We can still call this reflection, but it is rather different from analysing past experiences in order to learn from them (Korthagen & Vasalos, 2009).

Traditional view of reflection	*Core Reflection*
- Reflection on problems - Focus on the past - Focus on the situation - Focus on cognitive thinking/rationality - Focus on the outer levels of the onion model - Final goal: clear analysis of the situation	- Reflection on possibilities and ideals - Focus on the here-and-now and the future - Focus on personal strengths - Focus on presence as well as awareness of thinking, feeling, wanting and the environment - Focus on all levels of the onion model and their alignment - Final goal: being *in* the situation with full awareness of thinking, feeling and wanting, leading to a free flow of core qualities

Portfolio

An overview of the developed portfolio within the MOOC can be found in Appendix 2.

Beside the cases the MOOC wants to provide a portfolio where the student can reflect over his/her development as a dietitian. For this part of reflection the MOOC uses the model of Appreciative Inquiry, with the tools of feedforward interview and solution focused coaching and the pyramid of Miller.

- **Appreciative Inquiry**

The basic idea of Appreciative Inquiry (AI) is to build organizations around what works, instead on fixing what's wrong. The purpose is to bring the positive aspects of students' experiences into focus and discover what processes work well. The students have to collect concrete successes. AI works in 4 steps:

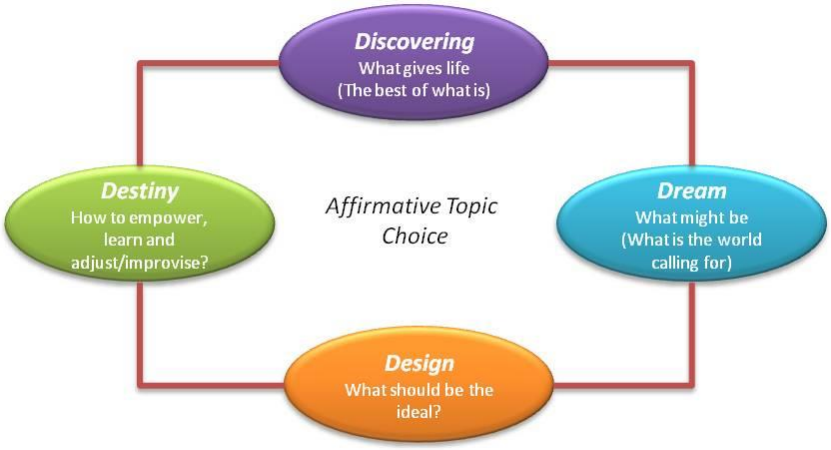


Figure 5: Model of Appreciative Inquiry (David Cooperrider and Ronald Fry)

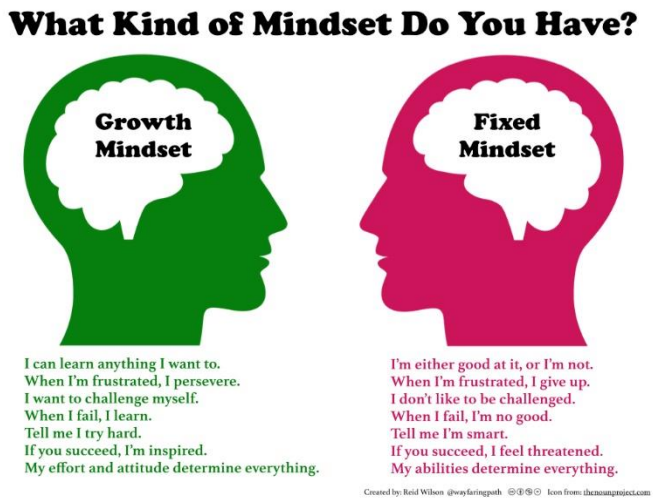
1. Discovering
   What went well? How becomes the story of the topic successful? What makes that it went well?
2. Dream
   What will I achieve in life in my professional carrier, with my studies? How my live will look like if I can show each day my capacities? In which situation would it be? Can I do this alone or rather in a team? What's the result of it and what's the interest?
3. Design
   What can I do to become closer to this dream? What I have to do to make this dream come true and how many energy I will spent to it?
4. Destiny
   What can I do now to move forward? How can I use my strengths at this moment?

The reflection in the MOOC also wants to focus on the solution of a problem. There are several advantages to work with solution-focused coaching (DeJong & Berg, 2001; Lindfors, 1997).
If the MOOC wants to be a solution-focused coach, there are several aspects that are important:

- Keep contact: attention and interest for the work of students is important and the basic of a good participation.

- Clear the context and recognise the problem: describe the situation where the problem exist, but don't try to find the cause.
- Formulate goals and describe successful situations: it's important to say that a goal is not just the absence of a problem.
- Discover resources: the resources are the strenghts of the students. Where are you good at? What feels good? What makes you proud?
- Identify and analyze positive exceptions: all problems come in different ways. When you can find exceptions, the start of a solution is probably there. Example: when is the problem not absent? What was different?
- Give compliments: the self-esteem of a student has an important value. It stimulates the collaboration and changes the focus form problems to solutions.
- Use scales: a great tool to use in solution-based coaching are scales from 0 (= the problem is at his worst) to10 (the goals are realised).
- Forward-looking: use the question of a miracle: the student has to discribe the situation when there would be a miracle where the problems are already solved. Visualize this situation. Try to make small steps to this situation. Small steps are important for the motivation of the student.

It's very important to achieve all of the prior aspects that students can have a growth mindset.



(Source: Clifton and Buckingham)

Clifton and Buckingham (2001) define a talent as 'each repetitious pattern of thinking, feeling or behave that can be used in a productive way'. Luc Dewulf (2011) add that acting from the talent can be recognised from the fact that there is little effort needed. Working from your talent is often related to experience the feeling of flow (Csíkszentmihályi, 1990).

The difference between a talent and a competence is described below:

A talent is congenital, sustainable and connected with your hart, passion, necessary to make the difference, broader than organisation and work; also in family, context and leasure time.

Competence is learned, connected with what belonged, necessary to achieve performance, less sustainable, matched with work and organisation.

Pyramid of Miller

We used the pyramid of Miller to give the students a reflection tool for IMPECD competences. Miller's pyramid of competence (figure 4) is a framework for assessing levels of clinical competence back in 1990 (Miller, 1990). Underlying levels are the foundation for the layer above. The first layer 'Knows' stands for the control of knows some knowledge. The second layer "Know how" stands for students knows how to apply that knowledge. For example the dietician can formulate a dietetic diagnosis. These two levels test cognition. This is the area where students (or recently graduated dieticians) usually sit. The third layer "Shows" stands for showing how to apply that knowledge. A student who knows how to do something and can explain this. The evaluation of this performance objective is the most difficult to measure accurately and reliably. Artificial simulation exercises where the student has to demonstrate it to the teacher are often used. The last layer "Does" stands for the student who actually applies that knowledge in practise. An example of this layer is also observing of using video recordings of real consultations. The upper two levels test behaviour.

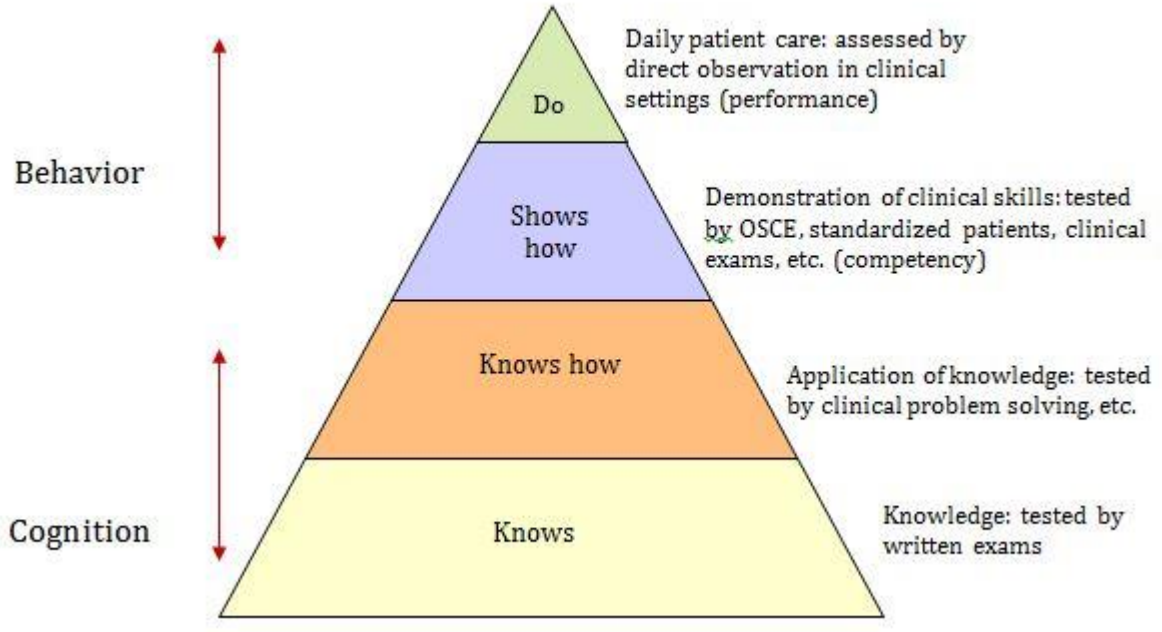


Figure 6: Framework for clinical assessment (Miller, 1990)

7. Survey on the use and knowledge of reflection and evaluation in European dietitians and students

Within the IMPECD project, a survey was performed by :

EFAD mailing to NDA's, Dietitians and HEI's
EFAD Facebook
ENDietS mailing and bulleting
ENDietS Facebook

A report with the full methodology and results is available on the IMPECD website, but the main outcomes are also specified below.

79 respondents coming from 20 different countries (almost) fully completed the survey, of which 32 where dietitian in various fields of work (sometimes in combination with teaching) and 32 were a student of dietetics

Reflection

Most of the respondents are familiar with reflection, but only half of them reflect in a formal way. 15,2% reported not the reflect at all.
Teachers of a HEI for dietetics was asked about the reflective practices of their students. They reported in 69% of the cases that it is mandatory to demonstrate reflection in a formal way for their students during their studies and/or practice placement.

The majority of the respondents had a preference for using pre-structured short questions for reflection.

We also checked whether respondents where familiar with standards for dietetics developed by EFAD, such as the "European Dietetic Competences and their Performance Indicators" . 71% of the respondents were not familiar with it. From those who were familiar with it, all but one reported that those EFAD competences and performance indicators could be used as a reference for IMPECD purposes.

Professional Recognition and Accreditation

We referred to the system of formal recognition of continuous professional development will be referred as 'accreditation'. Such accreditation might be a requirement to be registered as a dietitian in certain countries.

38% of the respondents mentioned that Life Long Learning (LLL) are officially required in their country, 33% didn't know it. Nevertheless, more than half (56,1%) keep track of own professional development by using a portfolio

Evaluation

Considering evaluation methods, the testing of practical issues and general theoretic principles are thought to be important by the respondents. The respondents indicated that mixed methods are appropriate, such as:

- Evaluation tests after each step in the case study
- Decision-tree based testing (= the participant decides on a certain action to be taken in the dietetic care process which could lead to a positive or negative outcome for the patient)
- Multiple choice

More information on the actual methods of evaluation can be found in chapter 4 of the syllabus and on the IMPECD website.

8. Use of the IMPECD MOOC in a curriculum

Prerequisites

- **International collaboration** among students is required e.g. use of discussion board

- Cases can't be open all the time: **a fixed timeline** is essential to provide a scheduled **order of cases and guidance** when going through the MOOC. In Appendix 3 the schedule is represented for the five HEIs belonging to the IMPECD consortium. A clear start and end are essential for the learner and the teacher (guide)

- The MOOC was developed to represent **5 ECTS points**, included the DCP part and the 10 cases. Given that for most universities 1 ECTS ~ 25 working hours:
    - the time spent on the DCP part and each case can be estimated around 10-12 hours for an average student.
    - the whole package of the MOOC (DCP + cases) can be estimated for an average students can be estimated around 120 hours (3 weeks)

  The actual workload universities can attribute to the MOOC also depends on the starting level of the students participating. E.g. students with a lot of background of dietetics and solving cases, or those who already have clinical practice experience probably require less time to go through the MOOC than students with less experience in this field.

- **Guidance by case developer** (experts) is required, with an equal work load for each case guide
    - Each case developer invests 12 hours for moderating and 4 hours for adapting their cases.
    - The guidance can be done by
        - Moderation of the discussion board
        - Online consult
        - Other method
- **Evaluation (formative of summative grading, acknowledging credits) is the responsibility of each individual university**
    - The grading method within the MOOC is programmed as follows:
        - progress questions count for 1 point
        - multiple choice and matching questions count for 5 points for each correct answer
        - single choice questions count for 10 points
    - The grading method within in the MOOC can be used for reflection, follow-up of students and/or give an indication for the final grade that the student gets. We recommended additional evaluation methods (e.g. an examination as part of dietetic classes) to check whether your students have achieved the learning outcomes that you expect of them

Options to implement the MOOC in the curriculum

Factors that influence how the MOOC can be implemented:

- Target group of students
  - With or without experience on clinical cases (first vs second vs third year students)
  - With or without practice experience (internship done vs not done)
  - Fulltime or part-time student (e.g. working students not following regular classes)
- Programme / Curriculum options
  - Mandatory or optional subjects (free subjects)
  - Number of students able or willing to participate (very small or very large groups have influence on the management and guidance in the MOOC)
  - Flexibility of the programme to implement a fixed timeline
- Teaching culture
  - Traditional (lecturing, teacher-driven) vs. non-traditional education (e.g. inverted classroom, students driven, sufficient attention for reflection)
  - Evaluation culture (e.g. method of examination)
  - Experience with online/digital learning methods

The MOOC can be used in many ways. Below some of the options are summarized.

How?	Points of attention	Pro	Contra
Supportive learning material for dietetics classes. Integration in existing classes	In addition to existing dietetics classes: Total workload of students would increase and that should be reflected in ECTS In substitution of parts of existing dietetics classes: principles of the inverted/flipped classroom can be introduced, meaning that students prepare their classes (here: go through the MOOC case) at home. The actual class can then be used to discuss about experiences, to make exercises on the topic or to clarify anything (e.g. when the national situation is somewhat different than the MOOC using international guidelines) For part-time students who are not following (all) regular classes	A shift workload for the teacher doesn't have to mean an increase in workload. Available class time can be used more useful than delivering content MOOC is an adequate method for self-study	No status quo in total workload/ECTS Possible mind switch needed for students and teachers Fixed timeline has to be complementary to the programme (also for the guidance of the cases) Fixed timeline reduces a bit flexibility

	Certificate of participation will be delivered. Examination of certain competences still needs to be done (can be part of the normal examination)		
Part of placement	All dietetics students have to perform practice placement. The ICDA mentions at least 500 hours of placement. For a placement of e.g. 14 weeks duration, the MOOC could replace an equal time investment of 2-3 weeks of placement, but divided over a whole academic year. Important note: all placement can never be replaced by a MOOC as offline competences ("do") have to be learned in real settings The participant will receive a certificate of participation. Separate evaluation might not be needed as this working method will be supportive to the internship; instead the reflective portfolio from the MOOC contributes to the overall placement records and reflection	Placements in many European countries are scarce. A substitution of 2-3 weeks could lighten the pressure of placement availability Can be implemented in almost any existing curriculum; each students will know on beforehand during which weeks each case will be open. During the pre-placement period, the MOOC offers a good preparation for the actual placement. Students will have some weeks less of placement, so this time can compensate for the extra efforts during the year	Although the MOOC works with realistic clinical cases, some aspects of real physical placements can never be replaced e.g. contact with patients, measurements, other disciplines, offline competences Could be scheduled in the students classes timetable (e.g. a full day without classes each two weeks during the whole semester) During the year the work pressure for students increases (but can be scheduled)
Free subjects / projects / thesis	Those programs offering free choices concerning dietetics skills could offer this to their students. The university has the own responsibility to check whether the workload and purpose of the MOOC fit their conditions on content and workload	Workload is spread over a whole year (could also be a contra for some students as this would lead to some very and some less intense study periods)	Difficult to make fixed cohorts as not always sure how many students would participate. Not for all universities suited as topic for projects or bachelors thesis

Independently/voluntarily by students	Students who feel the interest or the need to work on their dietetics skills could voluntary participate to the MOOC	Individual approach, students will get to know their strengths and weaknesses concerning dietetics case solving. Strong element in personal professional development	Voluntary, so can't be rewarded in the general programme. Students has to participate to the whole MOOC

Decision about the implementation and evaluation of the MOOC in the curriculum of the five HEI´s

- Evaluation and reflection

After two ISPs during which the MOOC was tested, different methods of reflection and evaluation have been tested. At the current stage, the following decisions have been made for the first run of the MOOC starting is summer term 2019:

- Reflection: each case will use the portfolio by means of copying the reflection questions into each individual portfolio document
- Evaluation: during the first year, we offer both next options for each partner university:
    - Using the grades calculated in the MOOC:
      The grading system in the MOOC is not yet optimal: there are still some problems and uncertainties about using open questions, marks scored through multiple choice question, not grading of reflection questions. The 'score' given by the MOOC is therefore not 100% valid, but gives a good indication of the learners performance.
    - Using the portfolio:
      The portfolio could be used as a base for evaluation. Universities that are familiar with assessing students through portfolio should be experienced with this system. Universities that are not familiar with this, could try-out this and also gain experience by doing it.

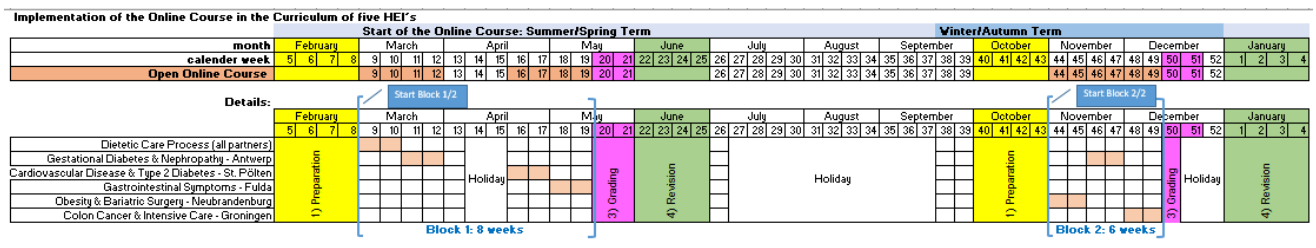
➔ Both methods are in particular suited for formative evaluation: it gives insight in the learners progress, learning method or development of competences (especially reflection and collaboration skills).

➔ For final summative grading, we recommend to test the dietetic knowledge/skills through traditional examination methods, in order to obtain an objective and valid score.

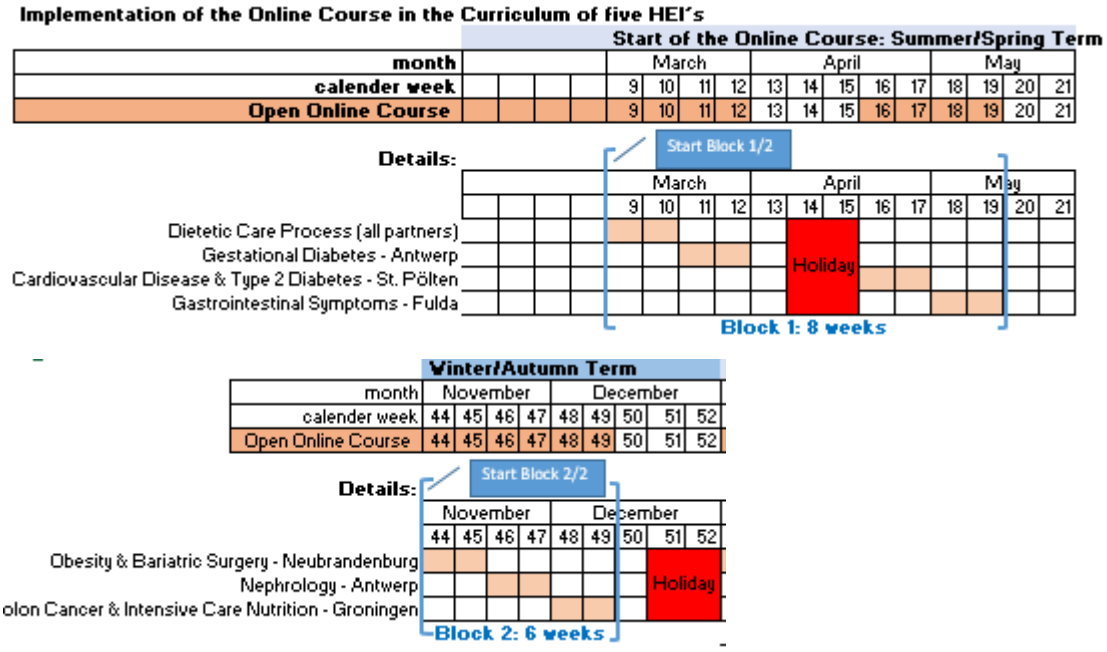
➔ These principles are very complementary to the idea of using the MOOC as a supportive learning method within (dietetic) classes

- Time schedule

The process for our MOOC for the current IMPECD partners will follow this schedule :



Each cycle of the IMPECD bMOOC starts in February and ends in January of the following year. The bMOOC is built out of two blocks. Block 1, consisting of Introduction, Dietetic Case Process, Gestational Diabetes, Cardiovascular Disease & Type 2 Diabetes and Gastrointestinal Symptoms, is guided from March to May (8 weeks). Block 2, consisting of Nephropathy, Bariatric Surgery and Colon Cancer & Intensive Care, is guided from November to December (6 weeks). Before each block, a one-month preparation phase offers the case developers the opportunity to update his/her case. Furthermore, a new Moodle®-course with all changes is implemented. After every block, the case developer does bMOOC-reated grading. This means, that the case developer sends case-related grading to the other HEIs. In the revision phase case developers adopt the cases according to the learners feedback, if necessary.
Learners from non-participating HEIs receive a certificate of attendance in January. Therefore, they have to participate more than XX% of the bMOOC.



Appendix 1: Comprehensive overview of Learning Outcomes in IMPECD MOOC

The legend:

	1. Methodological practitioner
	2. Knowledge of Dietetics (Diet expert)
	3. Evidence based practitioner
	4. Reflection & critical thinking
	5. Lifelong learning
	none

Batch	DCP-step	LO knows *The learner...*	LO knows how *The learner...*	LO shows how *The learner...*
DCP in general	DCP in general	defines the DCP as a process model.	explains the aims and principles of the DCP in general.	reviews the meaning of the DCP for professionalisation in Dietetics.
	Dietetic Assessment	defines the central statement of Dietetic Assessment as the first step of the DCP.	explains the aims and principles of Dietetic Assessment.	reviews the operationalization of Dietetic Assessment.
	Dietetic Diagnosis	defines the central statement of Dietetic Diagnosis as the second step of the DCP.	explains the aims and principles of Dietetic Diagnosis.	reviews the operationalization of Dietetic Diagnosis.
	Planning Dietetic Intervention	defines the central statement of Planning Dietetic Intervention as the thrid step of the DCP.	explains the aims and principles of Planning Dietetic Intervention.	reviews the operationalization of Planning Dietetic Intervention.
	Implementing Dietetic Intervention	defines the central statement of Implementing Dietetic Intervention as the fourth step of the DCP.	explains the aims and principles of Implementing Dietetic Intervention.	reviews the operationalization of Implementing Dietetic Intervention.
	Dietetic Outcome Evaluation	defines the central statement of Dietetic Outcome Evaluation as the fifth step of the DCP.	explains the aims and principles of Dietetic Outcome Evaluation.	reviews the operationalization of Dietetic outcome Evaluation.

Batch	DCP-step	LO knows *The learner...*	LO knows how *The learner...*	LO shows how *The learner...*
CASE 1: Lower gastrointestinal disorders: <u>lactose intolerance</u>	Dietetic Assessment	identifies Dietetic Assessment tools related to gastrointestinal nutrition problems.	analyses Dietetic Asessment data related to gastrointestinal nutrition problems.	reviews the results of Dietetic Assessment related to gastrointestinal nutrition problems by using critical thinking.
	Dietetic Diagnosis	analyses the consequences of a careless lactose free diet.	identifies the aetiology of the dietetic related problems.	creates the Dietetic Diagnosis by formulating PASR-statements.
	Planning Dietetic Intervention	develops a proposal for prioritizing the PASR-statements for Sofia's case.	formulates ideas for content of suitable intervention.	decides about the correct process indicators.
	Implementing Dietetic Intervention	reflects the actual health status of Sofia Berger.	describes the adherence of Sofia.	reviews the implemented intervention of Sofia critically.
	Dietetic Outcome Evaluation	identifies the tools needed to assess the outcome indicator.	analyses the comparison of outcome indicators.	reviews the Dietetic outcome.
CASE 1: Lower gastrointestinal disorders: <u>coeliac disease</u>	Dietetic Assessment	identifies different causes for Sofia's persistent gastrointestinal symptoms.	describes the completeness of Sofia's assessment data for celiac disease.	evaluates the relevance of Sofia's assessment data.
	Dietetic Diagnosis	selects correct evidence-based guidelines for diagnosis and management of celiac disease.	explains dietetic related problems for Sofia's case.	creates PASR-statements to express the Dietetic Diagnosis of Sofia.
	Planning Dietetic Intervention	creates goals for Sofia's Dietetic Intervention.	arranges the dietetic regime according to the guidelines.	reviews potential risks of a dietetic regime.
	Implementing Dietetic Intervention	characterizes the important factors for implementing the Dietetic Intervention for Sofia.	develops strategies to improve the Dietetic Intervention for Sofia.	decides about possible reasons to modify the Dietetic Intervention for Sofia.
	Dietetic Outcome Evaluation	identifies the outcome parameter which need to be assessed to Sofia's case	combines the tool of the outcome indicator to the corresponding assessed data.	evaluates the outcome of Sofia's Dietetic Intervention.

Batch	DCP-step	LO knows *The learner...*	LO knows how *The learner...*	LO shows how *The learner...*
CASE 2: Gestational diabetes	Dietetic Assessment	identifies the ranges of the lab data	demonstrates which test is adequate to diagnose gestational diabetes .	evaluates the results of the Blood glucose level pre -and postprandial
	Dietetic Diagnosis	justifies the weight they have to use for the patient.	interprets the guidelines of energy intake which are given.	completes the ICF-model.
	Planning Dietetic Intervention	identifies which nourishment contains the most carbohydrates.	enumerates all the important micronutrients for a pregnant patient.	decides which nutritional goals are the most important.
	Implementing Dietetic Intervention	identifies the correct dietetic treatment for the patient.	motivates what to do in case of a hypo.	recommends the correct food choice for patients with gestational diabetes.
	Dietetic Outcome Evaluation	mentions the most important parameters which should be monitored during the follow-up.	analyses the blood glucose levels before and after a meal.	evaluates the treatment of the case.

Batch	DCP-step	LO knows *The learner...*	LO knows how *The learner...*	LO shows how *The learner...*
CASE 3: Obesity	Dietetic Assessment	lists the relevant tools for physical assessment	reflects on different kinds of food protocols	provides an overview of nutritional problems
	Dietetic Diagnosis	identifies measurable signs for PASR-Statement	examines the guidelines for recommendations on high glycaemic sugar intake	determines the right PASR-statement
	Planning Dietetic Intervention	identifies the right goals for energy intake	motivates the short-time goals (e.g. after three months) of treatment	determines which long term goals are suited for Mr. Becker
	Implementing Dietetic Intervention	lists the long term goal suited for Mr. Becker after one year of treatment	provides an overview which components containing high sugar content.	determines the correct behavioural dietetic intervention methods
	Dietetic Outcome Evaluation	identifies the correct indicators for monitoring	finds out relevant data for monitoring and evaluation management	evaluates a good future scenario for Mr. Becker after one year of treatment

Batch	DCP-step	LO knows *The learner...*	LO knows how *The learner...*	LO shows how *The learner...*
CASE 4: Coronary heart disease and hypertension	Dietetic Assessment	selects the glucose-lowering agents that may cause hypoglycaemia.	concludes, through comparing eating behaviour, client history and clinical status, the three most important Dietetic Diagnoses for Intervention Planning.	has considerations about his decision
	Dietetic Diagnosis	classifies nutrition problems / aetiologies / signs & symptoms / resources of Miss Heart	connects dietary assessment data to the relevant ICF-categories	critically reviews a dietetic diagnosis using PAS(R)
	Planning Dietetic Intervention	selects the three most important Dietetic Diagnoses for Intervention Planning	explains why she/he has chosen these three Dietetic Diagnoses as the most important ones	creates SMART therapy goals for Miss Heart
	Implementing Dietetic Intervention	identifies barriers for behaviour change for Miss Heart	analyzes the consultation indicating at which stage of behaviour change Miss Heart is	critically reviews the consultation
	Dietetic Outcome Evaluation	identifies relevant parameters for Monitoring and Evaluation of the whole case	defines the parameters which are likely to show changes in the prioritized Dietetic Diagnosis	evaluates the result of the case

Batch	DCP-step	LO knows *The learner...*	LO knows how *The learner...*	LO shows how *The learner...*
CASE 5: Cancer	Dietetic Assessment	selects which information is important to collect as part of the nutritional assessment related to colorectal cancer.	demonstrates which screening instrument on the risk of malnutrition is adequate in a patient diagnosed with colorectal cancer.	evaluates various lab results for a patient diagnosed with colorectal cancer.
	Dietetic Diagnosis	indicates which components are needed to formulate a dietetic diagnosis for a patient diagnosed with colorectal cancer.	indicates information missing in order to formulate an adequate dietetic diagnosis for a patient diagnosed with colorectal cancer.	provides the correct dietetic diagnosis based on the PAS(R) statement for a patient diagnosed with colorectal cancer.
	Planning Dietetic Intervention	identifies the focus of the dietetic intervention for a patient diagnosed with colorectal cancer.	motivates which dietetic intervention he should select for a patient diagnosed with colorectal cancer.	provides suitable dietary recommendations for the implementation of the dietetic intervention for a patient diagnosed with colorectal cancer.
	Implementing Dietetic Intervention	The learner decides the correct communicative techniques and when to use which one.	defines the stage of behaviour change the client is in.	calls the various disciplines of the multidisciplinary team for a client diagnosed with colorectal cancer.
	Dietetic Outcome Evaluation	identifies important parameters for the evaluation of a patient diagnosed with colorectal cancer.	concludes the re-assessment in a patient diagnosed with colorectal cancer.	determines which elements are important in the re-assessment of the dietetic monitoring in a patient diagnosed with colorectal cancer.

Batch	DCP-step	LO knows *The learner...*	LO knows how *The learner...*	LO shows how *The learner...*
CASE 6: chronic kidney disease	Dietetic Assessment	identifies the important values for patients who suffer from diabetic nephropathy and are treated with haemodialysis.	examines the patient's nutritional status correctly.	decides which screening tool is the best to use for this case.
	Dietetic Diagnosis	puts missing information in the right order in the ICF-model.	concludes in which stage of CKD the patient is situated.	determines whether the patient suffers from undernutrition.
	Planning Dietetic Intervention	mentions the main and sub goals of the dietetic intervention for this patient.	finds out the energy requirement for the patient	determines which micronutrients are important in patients on haemodialysis.
	Implementing Dietetic Intervention	identifies the correct dietetic treatment for the client.	uses a decisional algorithm for the management of PEW in HD patients to conclude which first step has to be taken in the treatment.	recommends the right food for patients on haemodialysis.
	Dietetic Outcome Evaluation	identifies the most important factors that need to be monitored and can connect them with the right time interval.	treats the patient with the right additional therapy after a deterioration in the patient's status.	estimates the maximum amount of IDPN that can be given.

Batch	DCP-step	LO knows *The learner...*	LO knows how *The learner...*	LO shows how *The learner...*
CASE 7: diabetes mellitus type 2	Dietetic Assessment	identifies problematic lifestyle patterns of Ms Heart.	concludes which are the correct laboratory parameters of the patient indicating a problematic lifestyle pattern.	reviews the assessment procedure critically.
	Dietetic Diagnosis	classifies nutrition problems / aetiologies / signs/ symptoms / resources of Ms Heart.	connects dietary assessment data to the relevant ICF-categories.	creates a suitable recommendation of meal distribution for patient with insulin resistance.
	Planning Dietetic Intervention	selects the glucose-lowering agents that may cause hypoglycaemia.	concludes, through comparing eating behaviour, client history and clinical status, the three most important Dietetic Diagnoses for Intervention Planning.	assesses SMART therapy goals for the patient.
	Implementing Dietetic Intervention	identifies barriers for behaviour change for Ms Heart	analyses the consultation and concludes at which stage of behaviour change Ms Heart is.	implements concrete steps in order that the patient can be reinforced to achieve his goals.
	Dietetic Outcome Evaluation	identifies relevant parameters for Monitoring and Evaluation for the whole case.	provides an overview of the parameters which are likely to show changes in the Dietetic Diagnosis.	verifies the right elements for the follow-up treatment.

Batch	DCP-step	LO knows *The learner...*	LO knows how *The learner...*	LO shows how *The learner...*
CASE 8: Bariatric surgery	Dietetic Assessment	lists the relevant multidisciplinary team involved in the process of a bariatric surgery	analyses the pre-operational procedure	comments the process of assessment in terms of providing nutritional problems
	Dietetic Diagnosis	identifies dietetic problem related to the immediate post-operative period of time, as part of the PASR-Statement.	examines the guidelines for recommendations on immediate post-operative dietetic care	comprehends the systematics of PASR and can implement a PASR-Statement
	Planning Dietetic Intervention	identifies the right goals for food verity, eating and drinking habits immediately after the procedure.	motivates the short-time goals (e.g. after three months) of treatment	
	Implementing Dietetic Intervention	selects which portion sizes are suitable for the post-bariatric time	finds out the patient's major problem in order to apply accordingly the needed intervention	implements guidelines recommendations for the client's protein needs
	Dietetic Outcome Evaluation	acknowledge possible complications due to bariatric surgery	finds out relevant data for monitoring and evaluation management	determines relevant data for patients experiencing bariatric surgery for long-term and life-long dietetic and nutritional recommendations.

Batch	DCP-step	LO knows *The learner...*	LO knows how *The learner...*	LO shows how *The learner...*
CASE 9: Metastases, stoma, refeeding syndrome, (par)enteral (tube) feeding	Dietetic Assessment	selects which kind of information the dietitian needs to complete a dietetic assessment.	summarizes which part of the PG-SGA SF needs to be examined.	
	Dietetic Diagnosis		completes the ICF-model to define a suitable dietetic diagnosis.	provides the correct dietetic diagnosis based on the PAS(R) statement for a patient diagnosed with colorectal cancer, metastases and malnutrition.
	Planning Dietetic Intervention		motivates which nutrional needs are appropriate for a client taking his nutrional status into account.	provides a suitable start-up scheme for tube feeding for a patient diagnosed with colorectal cancer, metastases and malnutrion.
	Implementing Dietetic Intervention		defines what a patient with colorectal cancer, metastases and malnutrion can eat and drink besides the tube feeding.	decides which tube feeding is most suitable in order to improve the nutrional status of a patient with colorectal cancer, metastases and malnutrion before surgery.
	Dietetic Outcome Evaluation	identifies important parameters for the evaluation of a patient diagnosed with colorectal cancer, metastases and malnutrition in order to prevent refeeding syndrome.	motivates which components a dietitian should taken into account when a patient receives adjuvant chemotherapy.	

Appendix 2: Portfolio in the IMPECD MOOC

1.1 General data of the student

PUBLIC INTRODUCTION

General data (name, country, school,..)
Link to sociale media (facebook –LinkedIn)
Short creative presentation of themselves (use an alternative media like short video / photo / prezi /…)

PRIVATE

- What is your motivation to go through the MOOC?
- Which competences do you want to reach after completing the MOOC?
- Which goals (short and long goals) do you want to reach after completing the MOOC?

1.2 Reflection formats

We follow the vertical way: this means going through each step of the DCP for one case, then start the next case. After several steps in the DCP the student fills up certain reflective questions. There are three ways how to do a reflection in the MOOC:

1) Deep reflection
2) Short reflection
3) General reflection of all cases

In the table below you can find a short resume of these three different reflection formats. Under the table you can find reflection questions used in case of the gestational diabetes and the case of the chronical kidney disease.

1) DEEP REFLECTION	2) SHORT REFLECTION	3) GENERAL REFLECTION OF THE MOOC (ALL THE CASES)
Portfolio structure: *Step 1 – 3* *Deep reflection: 1 – 3 reflection questions* *Step 4 -5* *Deep reflection: 1 – 3 reflection questions* *After step 1-5:* *Deep reflection: 1 – 3 reflection questions*	*Short reflective questions after each step but not always necessary, only when relevant.* ***For example:*** *This task I find difficult* *0-1-2….-9-10* *This task is relevent* *…* *This can be indicated with* *Yes/ no* *Figures* *Smileys* SHORT REFLECTION AFTER THE WRONG CHOICE *Reflection question (short) after the wrong choice (bad scenario)*	*General reflection + evaluate yourself using the IMPECD flower*

1.2.1 Deep reflection

1.2.1.1 Step 1-3

- A. Evaluate the general progress of step 1-3.

What went wrong? Give a concrete example. What went right? Give a concrete example.

- B. When you look back to step 1 – 3 of the DCP what would you do different in the future by solving the same/ similar case. With what result would you be satisfied?

1.2.1.2 Step 4-5

- On a scale of 0 to 10 indicate how satisfied you are with your achieved results, where 0 is very dissatisfied and 10 stands for very satisfied. Explain.

- Evaluate the general progress of step 4-5.

What went wrong? Give a concrete example.

What went right? Give a concrete example.

- What did you definitely learn from this exercise? Choose three of the following items and explain why you choose them.

Evidence based practitioner – Main goals and sub goals - critical thinking – the different steps of the DCP – Methodically handling – work independently – creativity – Lab Analyse – making a correct dietetic diagnosis – set priorities - reflective thinking

1.2.1.3 Reflection of all the steps 1- 5

- What has hindered you in solving the case (step 1-5)?
- What helped you in solving the case (step 1-5)?

1.2.2 Short reflection

- On a scale of 0 to 10 indicate how difficult you found this exercise, where 0 is very easy and very difficult 10.
- On a scale of 0 to 10 indicate how deep you went into the literature to solve the evaluation questions. where 0 is on surface and 10 is very profound.

Short reflection after the wrong choice (Bad scenario)

- You made a wrong choice in treating the client. Imagine yourself this is for real. You work as a registered dietitian in the hospital where this client is treated. On a scale of 0 to 10 indicate how you feel by making this wrong choice(s).

- What will you do to improve yourself to make the right choice in the future?

- How motivated are you to continue this case? Fill in the scale: 0 – 10.

1.2.3 General reflection

IMPECD FLOWER

- Take a look at the IMPECD flower. Which of the competences did you achieved the most?

IMPECD COMPETENCE FLOWER:

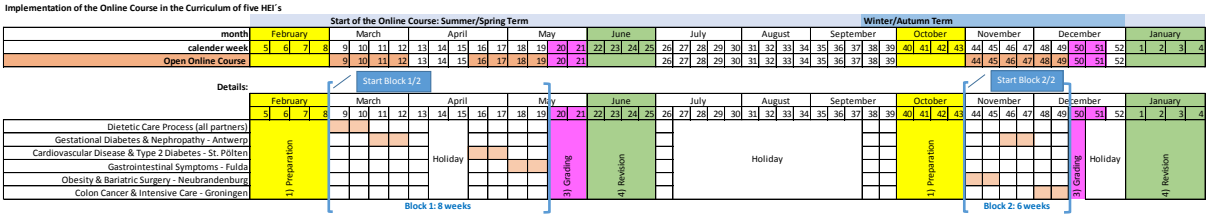
- Take a look at the IMPECD flower. Which of the competences did you think, are important to make more progress for yourself?

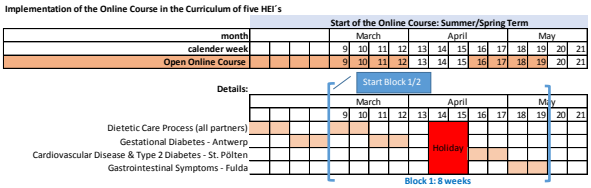
IMPECD COMPETENCE FLOWER:

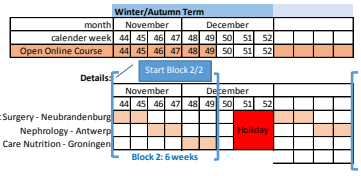
- Describe in SMART terms how you are going to achieve this goal.

IMPECD COMPETENCE FLOWER:

Appendix 3: Schedule and order or the cases/guidance for the five IMPECD universities







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