

Developing, implementing, and disseminating an adaptive clinical reasoning curriculum for healthcare students and educators



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D1.2 Report on solutions for the needs described in D1.1 and consequences for the curriculum development process

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1. Introduction

Building on D1.1., this deliverable report provides details on how the barriers and needs can be addressed. This document is the basis for the curriculum development process and quality management in WP2,3, & 4.

We followed a three-step approach: (1) In the specific needs analysis we asked stakeholders, faculty, and students for their solutions on how barriers could be addressed and how their needs could be met. (2) In a design thinking workshop, which was implemented in an online format due to the COVID-19 travel restrictions, we developed and discussed solutions within our team. (3) Within our team we prioritized the solutions provided in steps (1) and (2). And (4), based on these two sources and the literature, we established general, institutional and project-related solutions for the barriers and needs.

2. Quality criteria

- Implement a Design thinking workshop informed by the interview and survey results (deliverables D1.1a and D1.1b) according to best practices (had to be adapted to an online format).
- Participation of all partners in the design thinking workshop and providing an open atmosphere for discussion.
- Prioritization of solutions by the partners regarding their importance and feasibility.
- Provide and discuss solutions on an institutional and project level to ensure applicability also for non-partner institutions.
- Discuss consequences for all identified barriers, even if no solutions can be provided by DID-ACT for all barriers.

3. Solutions provided in the interviews and surveys

This chapter lists the solutions provided by interviewees and questionnaire respondents during our specific needs analysis. The solutions are categorized according to the barriers (see D1.1b). Suggestions addressing the student curriculum are marked with "(S)", solutions for the train-the-trainer course are marked with "(T)".

3.1 Culture-related

The culture-related category includes aspects such as communication and collaboration issues, a lack of reflection and error culture, or a strong hierarchy. The following solutions to address these aspects have been suggested in the interviews/questionnaires:

- Develop clinical reasoning experts who support the practitioners in their reflections (S)

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- Learn from students (S)
- Multi-institutional curriculum development and sharing (S)
- Involve educators/faculty in the development process (S)
- Change of curriculum, teacher attitude, culture needed (S)
- Awareness of political issues (T)
- Start small (T)
- Foster communication (T)

3.2 Teaching process

This category includes the perception that clinical reasoning cannot be taught, a lack of awareness it can be taught, a lack of standards and guidance on how to teach or a lack of qualified faculty. Solutions provided in interviews/questionnaires were as follows:

- Train-the-trainer course (exchange among educators, educating teachers, asking questions) (S)
- Teaching unit guide (S)
- Tools for developing differential diagnoses (S)
- (Role) Modeling (by senior faculty) (S), multiplier strategy (T)
- Asking questions (S)
- High/easy accessibility (S)

3.3 Time-related

Time-related barriers and needs were a lack of curricular time, lack of time of educators for teaching or being a learner in a train-the-trainer course. Suggestions in interviews/questionnaires were:

- More personal resources (S)
- Student-centered teaching approach (S)
- Blended learning, Self-directed learning (T)
- Integration into clinical work/setting (T)

3.4 Motivation/support

This category includes aspects of financial incentives, clinical priorities, and top-down decision making. Solutions provided in this category were:

- Mixture of bottom-up and top-down implementation -> multiplier effect (S,T)
- Start with motivated/engaged educators -> multiplier effect (S,T)
- High-level introduction (dean) -> standard setting -> financing provided (T)
- Incentives & visibility, such as best teacher award (S)
- Include into habilitation process (T)
- Teachers have to like what they do (S)

3.5 Content-related

This category includes the lack of awareness of clinical reasoning, a lack of agreement what clinical reasoning is, and a lack of agreement between professions what clinical reasoning is. No solutions have been provided for this category in the interviews or questionnaires.

3.6 Assessment process

Neither interviewees nor or survey respondents provided solutions for this category.

3.7 Logistics

This category covers logistical aspects, such as a lack of technical infrastructure, lack of rooms and organizational challenges. No solutions have been provided for this category in the interviews or questionnaires.

4. Solutions provided by partners

Due to the mobility restrictions which were in place during the implementation of D1.2 we had to organize the discussion and elaboration of solutions for the raised barriers in a combination of asynchronous and synchronous online activities. The following steps have been implemented:

- (1) Asynchronous individual preparation phase (one week) in which each DID-ACT team member familiarized himself/herself with the barriers and needs identified in D1.1. Their task was to think of at least five ideas of how to overcome the barriers including at least one absurd/crazy idea. This phase was implemented in the DID-ACT learning management environment moodle.
- (2) Afterwards we met for an online meeting using the video conferencing tool zoom. In this meeting we split our team into four small groups in which the participants were asked to present their ideas and clarify any open questions. Back to the plenum, each group presented their ideas and we documented them using the whiteboard integrated in zoom. Finally, each participant was asked to rate the ideas on three levels: (a) important, (b) hard to implement, and (c) easy to implement.
- (3) After the meeting the ideas on the whiteboard were clustered by one team member according to the barrier categories of D1.1. The result is shown in figure 1.
- (4) The clustering was reviewed by all participants and revised accordingly.

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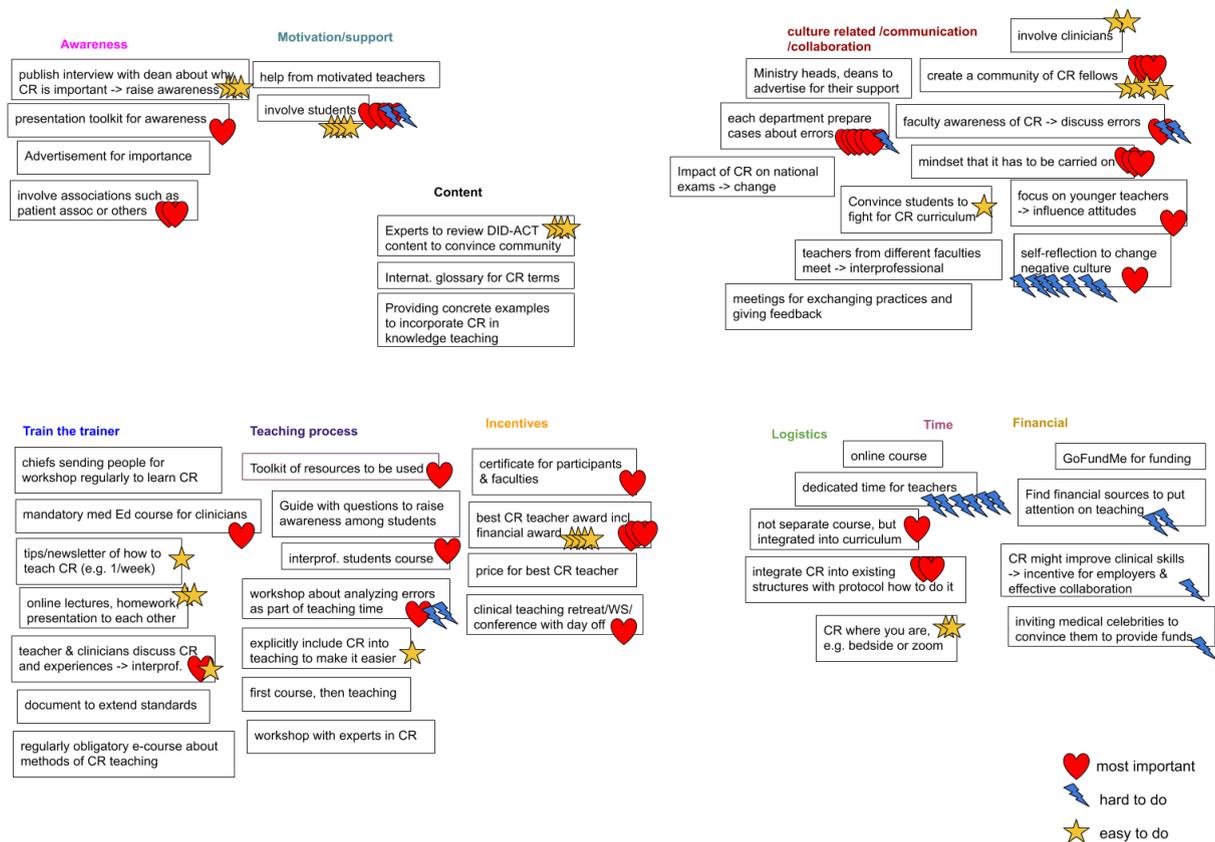


Figure 1: Clustered solutions to overcome barriers and address needs

5. Prioritization

As a first step of the prioritization process we discussed the following question:

"Which barriers / results from the analysis and/or our ideation workshop surprised you most and/or was striking?"

Overall, our team members were surprised by the relevance of some aspects that were provided in the interviews, such as interprofessional teaching or blended learning. Another aspect we saw was a high variety of responses, which partly might be explained by the heterogeneity of our interview and survey participants who had very different levels of clinical reasoning and curriculum development expertise. In our discussion we also identified connections between categories, for example the time- and culture-related barriers and needs.

Based on our own rating during the ideation workshop we developed the following ranking of solutions based on their importance (+1 point), easy implementation (+1 point) or **difficult** implementation (-1 point). Preferred are solutions which are both important and easy to implement. However, this ranking should just give an overview and we have to be careful with those solutions that are just "easy to implement" as we had no scores for "non-importance" and those merely easy might be ineffective.

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Rank	Points I (important), E (easy), H (hard)	Category	Solution
1.	7 (3 + 4 - 0)	Culture-related	Create community of CR fellows
		Incentives	Best CR teacher award including financial award
3.	5 (3 + 4 - 2)	Motivation/support	Involve students
4.	4 (5 + 0 - 1)	Culture-related	Each department prepare cases about errors
5.	3 (0 +0+3)	Culture-related	Involve clinicians
	3 (3+0+0)	Culture-related	Mindset that CR has to be carried on
	3 (0+3+0)	Awareness	Publish interviews with deans about importance of CR
	3 (0+3+0)	Content-related	Experts to review DID-ACT content
6.	2 (2+0+0)	Time-related	Integrate CR into existing structures
	2 (0+2+0)	Time-related	Teach CR where you (as a clinician) are
	2 (1+1+0)	Train-the-trainer	Clinicians and teachers discuss CR (interprofessional)
	2 (2+0+0)	Awareness	Involve associations
7.	1 (1+0+0)	Culture-related	Focus on younger teachers
	1 (1+0+0)	Time-related	integrate course into curriculum
	1 (1+0+0)	Incentives	Certificate for participants and faculties
	1 (1+0+0)	Incentives	Clinical teaching retreat
	1 (1+0+0)	Teaching process	Toolkit of resources
	1 (1+0+0)	Teaching process	Interprofessional student course
	1 (0+1+0)	Teaching process	Explicitly include CR into teaching
	1 (0+1+0)	Train-the-trainer	Newsletter/tips
	1 (1+0+0)	Train-the-trainer	Mandatory medical education course
	1 (1+0+0)	Awareness	Presentation toolkit

Table 1: Ranking of solutions provided by the DID-ACT team. All other solutions and suggestions from Figure 1 have not been rated or show a negative result in the ranking calculation. CR=clinical reasoning, I = important, E = Easy to implement, H = hard to implement

6. Consequences for the curriculum development process

Based on the solutions and the ranking described above we elaborated general, institutional and DID-ACT related consequences. These are not meant to be static and final, but will be dynamically updated throughout the curriculum development process if needed. We anticipate that following the Kern cycle of curriculum development we will encounter new barriers and needs during the development phase. We also will evaluate whether we still address the needs as specified and adapt our process accordingly if needed.

6.1. General consequences

For some barriers and needs we foresee that these have to be addressed on a general or overarching level. For example, the DID-ACT project can only initiate a change management process but it is beyond the scope of the project to solve all issues related to such a complex and time-consuming process. However, such general consequences are important to keep in mind and to raise awareness through DID-ACT.

It turned out that in our interviews and team discussions only solutions on an institutional and project level were discussed by the team and the interviewees. This might be due to the fact that changes on a general level are not easily recognizable and probably for most of our partners not achievable. However, since the barriers we discovered are common also in other areas, we discovered in the literature useful information.

Hall [1] presented a model for curricular change called Concern-based Adoption Model (CBAM) in the late seventies. Despite the time that passed from its inception this model is still relevant and in active use [2]. Concerning time- and culture related changes Hall suggested to

- show how the innovation can be used via gradual introduction rather than with a major, all-encompassing leap.
- provide answers in ways that easily address the small specific "how-to" issues that are the cause of concern.
- show how the innovation can be coordinated with other aspects of the teacher's day, so that it can be perceived as fitting in, rather than being added on.
- clarify how the innovation relates to other priorities that are potential conflicts in terms of energy and time demands on the teachers.

Related to our category "Motivation/support" he emphasized the importance of planning one specific task and then having a mail-back in a certain number of weeks and related the content he suggests providing information contrasting what the individual is presently doing

with what use of the innovation would entail. Relating the teaching process Hall's suggestion is to having others share information about their successful and unsuccessful practice.

A systematic review of successful practices in curricular change in medical schools was performed by Bland et al [3]. The study elaborated 35 features divided in three categories:

- organizational context of the curricular change: like relation of the change to the mission and goal of the organisation; strong internal networking, and buy-in of powerful individuals in the organization,
- characteristics of the curriculum itself: building widespread agreement the change is needed; realistic estimation of the effort of the understanding: not trivial and not overly ambitious),
- process of implementing the curricular change: including building a friendly, respectful work climate; involving organization's members (even those who are initially critical) in change process; frequent communication (including face-to-face meeting and demonstrations) and providing ongoing faculty training and support (including peer coaching) and acknowledgement that a performance dip (decline in performance) after the introduction of the change often occurs.

Finally, based on a recent scoping review Khan et al introduced the concept of curriculum viability [4] which recommends to monitor and consider in the development of the curriculum quality standards (e.g. WFME) and avoidance of curriculum inhibitors (e.g. lack of sufficient time for studying; low levels of integration; usability barriers in technology-related components of the curriculum).

6.2. Specific consequences

The following table provides an overview of institutional and DID-ACT specific consequences. Institutional solutions are individual consequences, which we will consider during the project phase if feasible and which might be different for each partner institution. Project-related consequences will be considered in our next WPs either for our project consortium and collaboration or for the later implementation phase. Project-related activities can also support institutional or even general solutions. Some of the project-related solutions have already been implemented or planned in the grant proposal, we highlighted such activities by adding the deliverable in which this aspect will be covered. The following tables show an overview of the collected solutions and consequences for each barrier/need category.

Level	1) Culture-related solutions	Comment
Institutional	1a) Involve and meet with the different heads (chairs, deans) responsible for the clinic, the medical curriculum, and the university. Workshop to inform and raise awareness but also discussion how to implement CR.	see also 1e)
	1b) Involve faculty and learners with developing materials.	see 1f)

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	<p>1c) Designate student and junior faculty champions for the project.</p> <p>1d) Encourage especially motivated and novice educators/clinicians or role models to take part in the DID-ACT TTT course (starting point for multiplier)</p>	see 1f)
DID-ACT	<p>1e) Provide information material and presentations for institutional awareness activities (for 1a)</p> <p>1f) Involve students on different levels (as project staff, for dissemination, for feedback,...) and encourage their active participation, specify our needs from students, and organize webinars to inform them about DID-ACT.</p> <p>1g) Multi-institutional and even international curriculum development process</p> <p>1h) Integrate error cases developed by educators/clinicians or students into the DID-ACT curriculum & (basis for discussion)</p> <p>1i) Define what can we offer CR fellows, what does being a CR fellow involve ("duties").</p>	<p>Additional activities for D7.4</p> <p>Hiring additional students (currently we have 2) for the consortium</p> <p>Covered by our project consortium</p> <p>Will be considered in WP2, WP3, and 4</p> <p>Additional activity in WP3 (see also 2f)</p>

Level	2) Teaching process solutions	Comment
Institutional	2a) Offer to visit internal seminars in individual departments with a presentation	see 1d)
DID-ACT	<p>2b) Archive and provide key literature resources--books, articles, etc</p> <p>2c) Create videos on best practices.</p> <p>2d) Create a template to help teachers and students in the process of CR</p> <p>2e) Develop TTT course to "create" CR experts and facilitate exchange</p> <p>2f) Define evaluation criteria for good CR teachers (to justify CR teaching award)</p> <p>2g) Toolkit of high-quality resources including tools for developing differential diagnoses (e.g. virtual patients)</p>	<p>Part of WP3</p> <p>Covered in WP1 & 2</p> <p>Will be considered in WP3.</p> <p>We will pay attention in WP3 to support the exchange</p> <p>Additional activity in WP5 & 3</p> <p>Covered in D2.3 and WP3 & 4</p>

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	2h) Provide a teaching guideline	Covered in D7.3
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Level	3) Time-related solutions	Comment
Institutional	<p>3a) Provide sufficient personal resources and dedicated time for educators</p> <p>3b) Consider blocked times for face-to-face sessions (e.g. whole day TTT workshop)</p>	
DID-ACT	<p>3c) Create clinical reasoning distance learning resources TTT and other</p> <p>3d) Blended learning format for the TTT course, in which we provide mainly during the face-to-face phase opportunities for interprofessional discussion, exchange, & collaboration</p> <p>3e) Following student-centered and self-directed teaching approaches</p> <p>3f) Applying learning analytics supporting feedback generation for the online phases</p>	<p>Covered in WP3, D2.3 and WP4</p> <p>Covered in WP3, focus on exchange and collaboration will be considered</p> <p>Covered in WP4</p> <p>Covered in WP5</p>

Level	4) Motivation/Support solutions	Comment
Institutional	<p>4a) Make sure that CR TTT course is integrated and recognized/ accredited in the faculty development program, if applicable it could also be mandatory for certain educators who teach CR and be included into the habilitation process</p> <p>4b) Evaluate how a best CR teacher award could be realized in your institution</p> <p>4c) Clinical reasoning consultation service?</p> <p>4d) The TTT course could be part of a clinical teaching retreat for clinicians.</p> <p>4e) Advocate for the CR curriculum in meetings with high rank members of the faculty (e.g. dean, programme & course coordinators)</p>	<p>Supported by the adaptable format</p> <p>see 4h)</p> <p>Supported by the adaptable format</p> <p>see also 1a and 1d)</p>
DID-ACT	<p>4f) Find support in the literature how CR can decrease the numbers of errors and increase the quality of health</p>	<p>Additional activity for WP2 and 3</p>

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	<p>care</p> <p>4g) Providing course certificate for TTT course</p> <p>4h) Evaluate how a best CR teacher award or best CR teaching course could be realized within the project.</p>	<p>Covered in D4.3</p> <p>see also 4b)</p>
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Level	5) Content-related solutions	Comment
Institutional	5a) Develop exchange between curriculum developers to develop a common understanding of CR.	
DID-ACT	<p>5b) Include additional experts (associate partners?) to review the curriculum and the TTT course content</p> <p>5c) Review literature to determine high value content to develop in TTT.</p>	part of WP3

Level	6) Assessment solutions	Comment
Institutional	6a) Raise awareness of “how-to’s” on efficient methods for assessment of clinical reasoning.	see 6b)
DID-ACT	<p>6b) Provide short “how-to’s” on efficient methods for assessment of clinical reasoning</p> <p>6c) Offer modular assessments for clinical reasoning.</p>	<p>additional activity for WP3</p> <p>Covered in WP3 & 4</p>

Level	7) Logistics solutions	Comment
Institutional	<p>7a) Bedside CR could be done.</p> <p>7b) Use (adapted) modules of the DID-ACT curriculum and the TTT course.</p>	<p>provided through WP2,3 and 4</p>
DID-ACT	<p>7c) Design curriculum modular and adaptive so it can easily be integrated at different institutions into existing teaching activities and the workplace of the clinician (e.g. clerkships, bedside teaching)</p> <p>7d) Sustain the developed CR curriculum & TTT course.</p>	<p>Covered in WP4</p> <p>Covered in D7.5</p>

Level	8) Awareness solutions	Comment
Institutional	8a) Contact local and national student associations with offer to collaborate	see 8b)
DID-ACT	8b) Involve associations (such as patient organization) 8c) Participation at scientific conferences.	Part of our associate partners and covered in WP7 Covered in D7.4

Tables 2.1-2.8: Institutional and project-related solutions and consequences.

TTT=Train-the-trainer course, CR = clinical reasoning.

6.3 Summary

Overall, we explored many different solutions to the barriers and needs identified in D1.1. Some of the solutions are on a very general level, especially for such fundamental aspects such as cultural change, which was one of the main needs the surveys and interviews revealed. It will be important for the DID-ACT project to have such solutions in mind, even if it will be beyond the project's scope to fully implement such changes.

On an institutional level, we discovered and discussed different solutions for all kinds of barriers. Some of them will be hard to achieve by the DID-ACT partners, such as providing more personal resources.

Some of the solutions have already been considered in the grant proposal, so, the interview responses emphasizing these aspects reassured us. For example, the train-the-trainer course is an important part of DID-ACT, which was already planned in a blended-learning format. However, as a solution for cultural barriers we will try to provide as much opportunity as possible for discussions, exchange, and collaboration among educators. Other solutions can be implemented with additional activities within work packages. For example, providing material for information and awareness-raising workshops in institutions will be implemented as an additional activity in WP7 as part of D7.4.

7. References

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