

# Improving Communication in Multicultural Teams - A Web-Based Model and its Application in Project Management Education

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**Abstract**—Technical solution skills – though important – are not enough for effective, multicultural teamwork. Despite broad consensus on the vital function of communication- and social skills, they tend to be underrepresented in the training of software-engineers and project managers. This is partly because such skills are less explicit than technical methods, tools, and artefacts. To address this deficiency, an openly accessible web-based communication model for multicultural teams (comMCT) was developed. It consists of four modules addressing structural, functional, organizational, and interpersonal/behavioral aspects of multicultural communication.

After presenting the empirically validated comMCT model, two scenarios of introducing comMCT into two academic courses within the computer science curriculum at the University of Vienna are discussed, along with the students' reactions and an online questionnaire capturing students' feedback on comMCT. In a nutshell, thoughtful, person-centered application of the model is expected to enhance learners' knowledge, practice, and reflection on communication issues and contribute to more effective and satisfied multicultural teams. Importantly, instructors as well as life-long learning program designers will find inspiration on including comMCT into their courses.

**Keywords**— *multicultural teams; communication skills; web-based model; person-centered learning; experiential learning; project-management education;*

## I. INTRODUCTION

Globalization and digital communication make communication skills, intercultural competence, and the ability to work in multicultural teams (MCTs) vital for project managers as well as team members. There is no doubt that people-issues are crucial for project success, as maintained, for example, by the renowned, international Standish Group (<https://www.standishgroup.com>). Hence, students as well as professional project managers should be prepared to face the communicative challenges. Being familiar with the dynamics, attitudes, techniques, and skills that have been found supportive of successful cross-cultural communication, is an initial step toward project success and overall satisfaction [1], [2]. However, communication- and social skills seem to be

often underrepresented in the technical education or training of software-engineers and project managers, partly because such skills are considered less academic and are less explicit than technical, well-specified methods and tools [3]- [5].

To compensate for this shortcoming, and, generally, improve communication in diverse teams, an openly accessible web-based communication model for multicultural teams (comMCT) has been developed as part of a doctoral dissertation of one of the authors [6]. The model is partitioned into four modules clustering structural, functional, organizational, and interpersonal/behavioral aspects of communication. It systematically describes technical, cognitive, behavioral, and attitudinal features of multicultural communication that have been found through a systematic literature review [7] and structured interviews with 20 international project-management professionals [8]. Thus, the comMCT model captures – in structured and accessible form – the wisdom of hundreds of scientific articles. Moreover, it complements the scientific findings by recent statements from experienced project managers. The web-based model can be accessed at: <http://www.3mpati.com/comMCTv2/index.php>. Once implemented, comMCT was evaluated in an expert evaluation study [9], in which 15 international project managers estimated the applicability of the model for their professional practice and for novice users.

The predominantly positive results of the evaluation study (see also Chapter IV) motivated one of the authors to include the comMCT model into two of her bachelor-level computer science courses at the University of Vienna and to study the effects in the form of case-studies. The two courses were 'project management' and 'communication.' In essence, students reflected upon their team experience in multicultural teams and listening to others' experiences of working/studying in diverse teams. Subsequently, they were asked to explore the comMCT model and to fill out a satisfaction questionnaire that had been specifically designed to provide for the students' qualitative and quantitative feedback on comMCT as a *learning resource*.

Intriguingly, the students' qualitative responses closely matched those of the international experts providing valuable insights on the current strengths of the model as well as some aspects that should be improved in future upgrades of the model. The most important finding, however, was that computer science students were able to derive insights from the comMCT model that they considered valuable. Moreover, they stated how they intend to put their learning into practice when working in multicultural teams. Hence, we conjecture that instructors aiming at promoting better and more effective teamwork in (culturally) diverse teams would find inspiration and resources in and through this paper. The same holds true for trainers and designers of life-long learning programs who may want to consider multicultural communication and teamwork explicitly as part of their courses.

The comMCT model was developed with industrial project teams in mind [9], but also with thoughtfulness about how to transfer or 'teach' its contents to novice project managers and team members. The *two case studies* described in this paper focus on the educational aspect along with the desire to gain insight on the perception and usability of the model in an academic context involving Austrian and international undergraduate computer science students. The respective courses took place in 2016 with groups of 50 and 15 students, respectively. The workshop-style and learner-centered course units [10]-[13] illustrated, how such a setting could help raising awareness for different work styles, levels of language-command, preferences, attitudes, and consequent behaviors in student teams and could be integrated into courses such as project management, software engineering, human-computer interaction, communication, etc. [3], [12].

Related research on teaching intercultural communication has been conducted in the field of professional and technical writing [14], [15]. In the context of computer science curricula, [16] had the rare privilege of conducting and researching a whole course on facing intercultural and interdisciplinary scenarios. The two case studies and scenarios described in this paper differ from the research mentioned above in so far as they do not deal with a whole course on (aspects of) intercultural communication, but aim to integrate this theme as a subordinate, cross-cutting concern into the computer science bachelor curriculum. Thus, they appear to be more broadly applicable in classical engineering curricula. However, their adaptation and application for in-depth development of intercultural communication skills in the style of [16] remains to be developed and tested. An effort similar to the one described in this paper, namely dealing with diversity as a cross-cutting concern in the context of software engineering, was described in [4]. All these endeavors tend to support constructive communication and an improved understanding for the global societal and work-related context [17], and in the broad field of engineering education [18].

This paper is structured as follows: Firstly, the communication model for multicultural teams (comMCT) along with its structure and design-rationale is described in Section II. Next, the research design of the evaluation study is

sketched in Section III, followed by a presentation and discussion of the findings in Section IV. The central Section V proposes two scenarios for integrating comMCT into project management and communication competence education in an academic context. Moreover, it proposes the integration of multicultural communication competence into professional, life-long project management training. Finally, Section VI discusses the findings and the concluding section summarizes major insights and suggests themes for further research and development.

## II. THE EVIDENCE-BASED COMMUNICATION MODEL FOR MULTICULTURAL TEAMS

### A. Genesis of the comMCT Model

The comMCT model was developed as part of a doctoral dissertation at the University of Vienna [6]. The model captures essential knowledge for communicating effectively in MCTs, and provides a web-application to make this knowledge available in a systematic, structured, and comprehensive way [19]. Its contents draws upon a systematic, qualitative literature study [7] followed up by a qualitative field study [8] aiming to explore features of communication in multicultural teams.

In the literature review, a total of 159 studies on cultural differences, the effects of diversity on teams, and the dynamics of multicultural teams were analyzed. In the field study, expert interviews with 21 experienced project managers were conducted and analyzed through a qualitative content analysis [8]. The field study's target group consisted of project management professionals who have been working or had worked as project managers in MCTs for five or more years, have managed at least two MCTs, and preferably hold a project management certificate. Finally, to approve the concept, the comMCT model was validated employing a structured, web-based qualitative survey among 15 project management experts [6], [8]-[9]. The major findings of that survey are summarized in Section IV and related to students' evaluations in the Discussion section.

### B. The Structure of the Model

As illustrated in Figure 1, the comMCT model considers the team as the central element that functions flexibly within the classical project boundaries of scope, time and budget. The arrows in the Figure indicate that the team is influenced by the project and organizational culture and reciprocally influences these cultures. The penetrating field of communication is clustered into four modules, reflecting the structural, functional, organizational, and interpersonal/behavioral aspects of communication. Each module encompasses several elements addressing technical, cognitive, behavioral, and attitudinal features required for effective communication in multicultural teams. Particular emphasis is given to exposing both benefits and disadvantages/risks of MCTs. The *structural module* includes the following seven elements: effective communication plan, open communication structure, an inter-connected communication system, adequate communication procedures/processes, suitable technical environment, ad-hoc calls with preparation, and using the right communication tools. The model provides three kinds of details for each

element: definition/explanation, benefits/function, and which advantages/opportunities – assigned with the MCTs – are to be utilized, or which disadvantages/risks are to be overcome through the related element and how.



Fig. 1. The structure of the com MCT model

The *functional module* addresses features such as effective goal and rule setting, work/time planning, monitoring, controlling, decision making, and ensuring sufficient participation, all with a particular emphasis on the multicultural composition of the team. Examples of features of the *organizational module* are effective team building, training, task-sharing, role and responsibility assignment, external support and, importantly, employing an adequate leadership-style. The vital *interpersonal/behavioral module* includes features such as forming a shared vision, sharpening soft-skills, shared attitudes and values, and several qualities articulated by the Person-Centered Approach [10], [13] such as empathic understanding and respectful, genuine sharing.

Overall, the model is designed to provide an encompassing and ubiquitously accessible resource for novice managers and team members, and to serve as a checklist for experienced professionals who may want to expand their communicative repertoire in multicultural teams [19]. Visit (<http://www.3mpati.com/comMCTv2/index.php>) for a web-based presentation of the comMCT model and refer to [19] for a detailed description.

### III. EXPERT-EVALAUTION STUDY OF COMMXT

#### A. Research Setting, Participants, and Methods

In 2015-2016, a qualitative online survey with 15 experienced international project managers stemming from 8 different countries was conducted [9]. This study served as a proof of concept and aimed at gaining insights about the users' perception of the comMCT model with regard to seven core

criteria: completeness, structure, language, redundancy, understandability, originality, and usefulness for the professionals as well as for novice users.

In order to elicit interviewees' experience and knowledge systematically and thoroughly, a *structured questionnaire* with open questions and closed, Likert-scale questions was employed for and made accessible via the comMCT website: <http://demo.moreit.com.tr/anket/index.php/438667/lang-en>.

The questionnaire was used as a main source for the data analysis. The interviewees' responses to the closed Likert-scale questions were analyzed using descriptive statistics and participants' responses to the open questions were systematically analyzed.

#### B. Limitations

The evaluation study is limited due to the number of participants. Nevertheless, it provides insight into comMCT's usability for project management professionals. It also provides promising results regarding the envisaged applicability of comMCT as an educational resource for novice users. Still, the experts' estimates regarding the applicability of comMCT for novice users and students require future research and validation. The two case studies in Section V address this educational concern within the framework of person-centered education [10]-[12].

### IV. THE EXPERTS' PERSPECTIVE ON COMMCT

In this section, the major findings of the evaluation study with particular emphasis on the use of the comMCT model for educational purposes are described and discussed.

#### A. Findings Regarding the Core Criteria

The majority of experts rated the model very positively or positively regarding the core-criteria of completeness, structure, language, understandability, originality, and usefulness. The only aspect on which experts disagreed was the model's *redundancy* that evoked critical remarks as to the repetition of the same or very similar information associated with closely related features.

#### B. Applicability for Project Management Professionals

In general, participants tended to perceive the model as useful. 73% (11 out of 15) of the participants answered 'yes!' and 13% (2 out of 15) 'rather yes'. One expert clicked 'partly yes partly no', and one stated that s/he 'doesn't know'. In the free text fields, project managers emphasized comMCT's usefulness as a check-list, and as providing a common vocabulary when working in MCTs. For example, one expert shared that it is "*definitely very useful for the mapping of certain communication aspects. It brings a common vocabulary; it can serve as a checklist when setting up a team or communication environment.*" [6]

#### C. Estimated Applicabilty for Novice Users

Regarding novice users, the experts were asked whether they perceived the comMCT model as practicable in the education of novice managers. Almost all of the participants agreed that the model would be useful to a person who had

limited experience working in and with MCTs, 67% (10 out of 15) responded ‘yes!’ and 27% (4 out of 15) ‘rather yes’. One participant answered ‘partly yes, partly no’.

One of the project managers emphasized comMCT’s usefulness for a novice by expressing that: *“Having a well-defined model to implement is always helpful for new starters. [...] Communication management is rather complex and practical and very much dependent on the environment. This model will provide all the dimensions to a person with limited multicultural experience.”*

#### D. Overall Characterization and Suggestions for Future Improvements of comMCT

Summarizing, Table 1 lists the strengths and weaknesses of the comMCT model derived from the experts’ responses to the open questions.

TABLE I. EXPERTS’ PERSPECTIVE ON STRENGTHS AND WEAKNESSES OF THE COMMCT MODEL

<i>Strengths</i>	<i>Weaknesses</i>
Based on a large literature pool	Static
Integrating professional’s experiences and thoughts	Overlapping elements
Detailed, comprehensive	Partly out of project manager’s influence
Connected	Lack of prioritization of features for different user profiles
Good use of web technology	Complex
Including social aspects	
Toolbox & check-list character	
Implementable in practice	
Good structure, understandable	
Adaptable due to modular structure	

Furthermore, the experts were asked about ideas on how the comMCT model could be optimized. For instance, one of the interviewees argued that comMCT could be adopted in layers by bringing a very simple model at the beginning, and refining it later for more experienced users. Other participants were concerned about their lack of influence on features given in the model but outside of their scope in practice. One of them argued that the organizational factors such as ‘a balanced cultural mix of the team’ were out of her/his hands as a project manager. Consequently, the model should support personalized views. Intriguingly, as will become clear later, the students’ concerns, suggestions, and appreciative comments were very similar to the experts’ perception of the model.

#### V. INTEGRATING COMMCT INTO POST-SECONDARY EDUCATION

Before elaborating on various educational contexts in which the comMCT model can serve as a resource, let us propose relevant learning outcomes in the context of project management and professional communication. Note that in academic courses such as those mentioned above, intercultural communication is just one of several themes to be covered and typically is not the central topic of such courses. In the

authors’ view, using comMCT in courses dedicated to intercultural communication would be particularly worthwhile and constitutes a topic for further research [16].

#### A. Learning Goals and Learning Outcomes

The proposed learning outcomes can be adapted depending on factors such as centrality of the theme within a course, time available, prior knowledge and experience, target audience, digital media available, academic or life-long learning context, etc.

Learning outcomes of educational offerings employing the comMCT model address the knowledge- and the experiential/skill/awareness level. Outcomes at the knowledge-level include:

- Participants can enumerate aspects of project management that deal explicitly with communication
- They can explain the essence of the four modules of the comMCT model
- They can assess the relevance of each of the four modules for their current involvement in a project
- They can name aspects of communication that are more difficult in multicultural teams
- They can name aspects of communication that are more potent and/or creative in multicultural teams
- They can explain the advantages and shortcomings of both digital and face-to-face communication
- They can describe the essentials of effective multicultural teamwork and which functional, organizational, structural, and interpersonal factors managers and team members need to take care of..

Learning outcomes at the experiential/skill/awareness-level include:

- Students can distinguish between internal, external, formal, and informal communication modes and are aware of potential culturally tuned patterns and habits that occur in the various modes
- They become increasingly aware of their own patterns, habits and preferences in the various modes and can appreciate that others may have different approaches to communicating in the various modes
- They are aware that the same (English) words may carry different meanings and connotations for people from different linguistic backgrounds
- They are aware that they may not assume that they have been understood unless the other side repeats the message in their own words and the two sides can confirm their understanding
- They can appreciate the value of active listening
- They build or strengthen awareness about diverse communication behaviors such that they can recognize such behaviors in themselves and others
- They can recognize risks and burdens as well as benefits and gains of multicultural communication within their team and seek to act upon them.

Since several of the learning outcomes address – or are connected to – the experiential level, experiential [10], [20] or student-centered approaches [21]-[24] seem particularly suited

to accompany students in achieving the learning outcomes collaboratively set for a course unit. The following scenarios provide examples on how this can happen.

#### B. *Integration of comMCT into a Basic Course on Project Management Including Social and Professional Competencies – Scenario 1*

“Successfully applying technical knowledge in practice often requires an ability to tolerate ambiguity and to negotiate and work well with others from different backgrounds and disciplines” [3, p. 15]. This quote from ACM/IEEE’s most recent (2013) guideline for computer science curricula gives tribute to diversity-related communication competencies being included in the curriculum. Due to the need to cover a broad range of competencies, and the fact that the comMCT model resource is very new, let us suggest and study the case of a small-scale inclusion of comMCT into project management.

The course on project management at the University of Vienna, Austria, is placed in the second year of the bachelor studies of computer science. Learning goals target both technological and professional knowledge and competencies. The course is run in 4 groups with 50 students per group in a mixed lecture-lab mode. An estimated third of the students have some migration background. Students get evaluated on the basis of conducting, documenting and reflecting small IT-related project in a small team (70% of the possible points) and individual work (30% of the possible points). In order to promote creative, self-organized learning and allow students to go into more depth in a project management-related field of their own choice, 15% of the possible points (i.e. half of the points for individual work) are expected to be spent on that self-selected theme. Thus, in the winter term of 2017, one of the instructors of the project management course briefly introduced the comMCT model to her students and offered them the option to choose its exploration as their self-selected topic.

The essence of the proposed scenario is a 4 step process, initiated by a *guided reflection* of students’ experience of working in multicultural teams. The reflection is followed up by a *self-paced exploration* of comMCT, targeted at establishing *associations* between one’s *experience* and the *theoretical information* provided by the model. The *subsequent evaluation* of the comMCT model would spread light on its applicability for novice users and provide hints for improvement. Students were assured that it was their genuine experience that would matter most such that critical and appreciative comments would equally be welcomed.

Students who decided to work on multicultural communication were introduced to that focal theme by the following *assignment* that was made accessible through a click on the course’s web application:

#### *Learning about Communication in Multicultural Teams*

Dear colleague:

This is to offer you an adjustable, research-driven option for completing your “focal theme.” The basic idea is that you get valuable inputs about a topic that is crucial for the success of any project on which people from different cultures

collaborate, namely “Communication in Multicultural Teams”. In return, the instructors of “project management” get your reactions, experiences, and ideas about learning to communicate effectively in multicultural teams. So we would mutually learn from each other and make a real contribution to the field and our knowledge, behavior, cultural intelligence, and attitudes toward constructive intercultural communication. Thank you for participating in this innovative learning project!

i) Reflect about your current situation:

- What makes you choose this focal theme?
- What would you like to know or to learn about communication in multicultural teams?
- How is your communication in your team going for you?
  - \* What are you satisfied with and want to keep?
  - \* Is there anything you are frustrated with?
  - \* What could be improved regarding communication?
  - \* How do you feel in your team?

ii) Visit: <http://www.3mpati.com/comMCTv2/index.php>

Carefully read the basis of the comMCT model. For each of the 4 modules of comMCT, take about 30 –60 minutes to explore the module and optionally inspect some of the reference links.

- Take notes to capture what you find relevant, interesting, and what is difficult to imagine/understand. Is there anything that could be left out or added?
- List about 5 adjectives that you would use when asked to describe the comMCT model.
- Connect the knowledge you acquired from engaging with the model to your own team experience. Identify at least three aspects or phenomena in your team that you see connected to the comMCT model. Describe these aspects and make the connection to the model explicit.

iii) Briefly summarize what you learned from engaging with the “focal theme”.

iv) Please fill in the Satisfaction Questionnaire on comMCT and briefly comment on your responses.

Thank you for your participation!

Four students chose to engage in the scenario described above. In the following, we summarize and cite some of their reflections and comments. Note that most citations were translated from German.

Regarding students’ motivation to choose the focal theme on multicultural communication, one student reflected:

*“I chose this theme because in the current semester we have been studying project management and the communication in our team, it didn’t suffice to keep all the project’s steps persistent and carry out every task. Thinking that our team was formed from 3 members with different nationality, it was very useful for me to learn about comMCT and to align the situation in our team with this topic.”*



Another student who had already built multicultural relationships in his job shared: *“If one wants to succeed in long-term international entrepreneurship, it is essential to know how to avoid conflicts that are based on cultural differences between partners from different cultures.”* Thus, students who chose to engage with the comMCT model typically were driven by some of their personal multicultural experience. They wanted to learn how to avoid mistakes and misunderstandings and how to deal with language difficulties.

Examples of learnings and suggestions regarding the individual modules were the following:

**Structural module:** The difficulty of multicultural teams that students had experienced most and hence could best relate to, were language difficulties. One student put it tellingly as follows: *“When every member speaks a different native language, it is quite hard to always find out what one or another member would intend, because of the speech level or even shyness.”* This student further shared: *“In my opinion, the advantage [of MCTs]: ‘Different work experience and different life experience’ is a good point and interesting to meditate about, because for any particular issue there could be many ways, or at least another way to approach it. So many peoples in a team, so many ideas are available for any problem or deadlock in the timeline of a certain project.”*

**Interpersonal module:** One student suggested a structural improvement in writing: *“I’d cluster and condense the list of professional competencies and values. Due to the large number of enumerations with just very subtle variations between the items, unfortunately, I completely lost the overview.”* Another student shared his opinion regarding ‘acceptance’ and ‘tolerance’: *“I think the ‘acceptance’ and ‘tolerance’ play an important role because only in that way a team member could accept the ideas of another and understand what they are tending in certain circumstances. [...] Sincerely I can say that if the acceptance and tolerance were fully accepted by every team member and especially by the team leader, there would never be any conflict between members of the team, even if they are speaking different languages and are coming from different cultures.”*

Another part of the assignment was to list 5 adjectives most descriptive of the comMCT model. On the critical side, students described the model as *“overloaded, redundant”,* and *“improvable by visualization,”* e.g. by mind-maps, tables, various diagrams, etc. However, this was their only criticism. On the positive side, the following adjectives were listed: *“global, multidimensional, effective, structured, realistic, practical, useful, informative, comprehensive, complete, understandable, innovative.”* Students could easily associate elements of comMCT with their own team experience. Examples of aspects they found particularly relevant were: *“effective goal setting, using the right communication tools, having time management skills”,* etc.

While the complete satisfaction questionnaire can be obtained by mailing the authors, Table II and Table III depict the results of two major sections of the questionnaire, namely the general questions and questions referring to individual parts of comMCT. Interestingly, in symmetry with the experts, students who had chosen to engage with the model found that

the model provided useful information, wasn’t difficult to navigate and fulfilled their expectations regarding its content.

Not too surprisingly, students’ views as to which parts of the model they’d like to come back (see Table III) differed. This may be due to their different interest in interpersonal, organizational, functional, and structural issues, as well as to the perceived relevance of these fields at the given point in time. One student who responded that he would not often use the model in the future commented that the model was so intuitive that he would not need to return to it often.

TABLE II. STUDENTS’ RESPONSES TO THE GENERAL QUESTIONS OF THE SATISFACTION QUESTIONNAIRE. N= 4

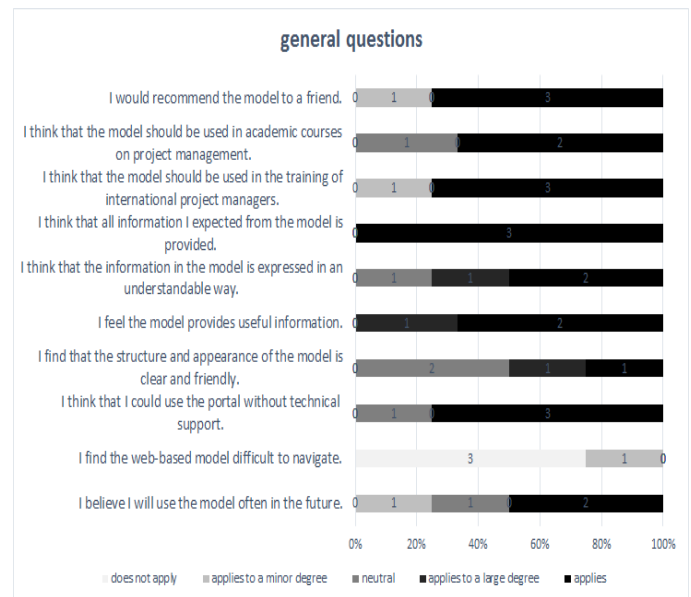
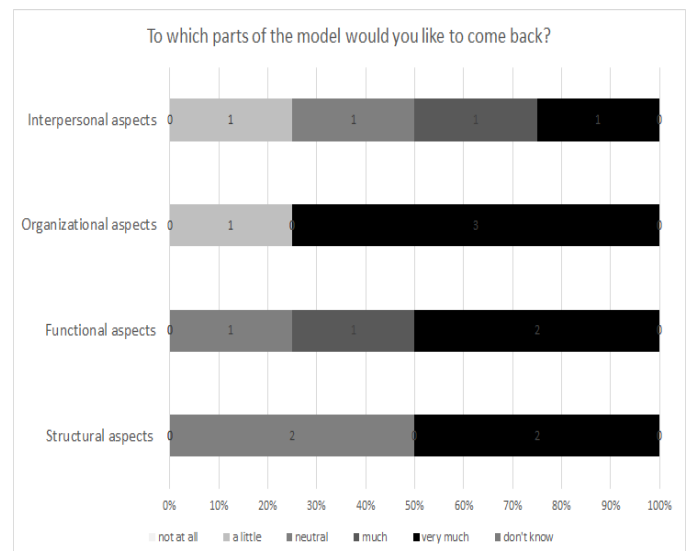


TABLE III. STUDENTS’ RESPONSES TO THE QUESTION TO WHICH PARTS OF THE MODEL THEY WOULD COME BACK. N= 4



The comment above illustrates that the free text fields in the satisfaction questionnaire (associated with each question) provided important information, without which the pure

checking of fields (as shown in Table II and III) could not be interpreted properly. As another example, consider the comment a student wrote why s/he'd suggest the model to a friend only to a minor degree. The reason was that s/he felt multicultural teams would be quite rare in his context and thus there was no indication of why the model should be suggested to a friend. From experiences like this, we learned how much added value can result from triangulating qualitative and quantitative methods!

In a nutshell, introducing comMCT as an optional learning resource to computer science students illustrated that those who perceive the theme as relevant are able to learn from comMCT in a self-organized and deeply meaningful way. This statement is derived from the observation that students tended to articulate how they wanted to change or extend their focus or behavior in upcoming multicultural teamwork.

### C. Integration of comMCT into an elective course on communication – Scenario 2

In the elective, bachelor-level course targeted at developing communicative competencies, the focus of one course unit was on facilitating students' awareness of communication processes in multicultural teams. Examples of such processes are how diverse members affect collaboration, or how they can constructively deal with team-mates' understanding and/or behaviors that differ from their expectations. In such a course, the personal experience along with the knowledge about multicultural communication and teamwork would be pivotal. The respective scenario included the following steps:

- Small-team reflection: In small-teams formed ad-hoc in class, students share what they consider to be benefits and drawbacks of multicultural teamwork.
- Ball game employing active listening: When catching the ball, students are expected to repeat the essence of what the speaker before them has said. Then they share one of their experiences or questions in the context of multicultural teams and pass the ball to someone whose experience they are interested in.
- Collecting on a flipchart: During the ball game, the instructor notes the essence of the students' experiences on the flipchart. Further experiences may be added from a follow-up dialogue in the group.
- Assignment: Exploring the comMCT model (at home).
- Reflecting on the course unit and sharing the views on comMCT in an online reaction sheet. Optionally, filling the satisfaction questionnaire.

Following this scenario, the *flipchart* contained items such as:

- Dealing with different cultures can and should be learned, since culture is important. Much depends on the motivation and personalities.
- Communication in one's mother tongue is not possible.
- Opportunity of learning the English language.

- Language barriers: English usually is not people's mother tongue such that understanding tends to be more difficult.
- It is important to achieve a common understanding of the function of leadership.
- There are prejudices because of one's origin, e.g. due to media reporting. Hence, clarification is essential.
- It is refreshing to work with others and the mutual complementation can be very useful.
- Professional competence can contribute to a good team climate and overcome differences.

From this enumeration it can be seen that students are aware of both advantages and drawbacks of multicultural teams. Once they inspected the comMCT model, their *online reaction sheets* [25] had even more specific statements and reflections. For example, a student wrote: *"If the climate is good, the communication will be open, and common preferences can be discovered more easily. It is important to look out for commonalities such as to find a common denominator."* Another student noted critically: *"I wasn't surprised that in the sphere of the university, where the focus is on fast successes, multicultural teams are not quite desirable. To exploit the strengths of multicultural teams one needs, first of all, time, to recognize these, and time is a scarce commodity in the university context."* Yet another student emphasized the added value of multicultural teams: *"Even though one needs more time and energy when working in multicultural teams, one can acquire new competencies and experiences."* Finally, an enthusiastic student shared: *"I'm taking a lot from the exciting sharing on multicultural teams and will definitely apply it in my upcoming multicultural teamwork. Language barriers can be overcome if a common denominator is found. First, clichés and prejudices possibly could be clarified such as to prevent their becoming a reason for conflict. Also, approaching work with a positive attitude and simply trying would be the way to go. If something doesn't work out well or evokes differences in opinion, these could be resolved through dialog with an open and understanding other. Openness and willingness are two basic attitudes that need to be emphasized in multicultural teams. Exciting discussion!"*

As the following reaction testifies, some students were eager to learn more about cultural diversity: *"Gert Hofstede's concept of cultural dimensions seems very exciting to me. Once I find time, I'd like to delve deeper into this topic."*

We wish to share that we adapt the scenarios from course to course and hope that interested colleagues would customize them according to their and their learners' emphasis. Surprisingly, as seen from the students' reactions, a one-hour interaction with/between students on the theme of multicultural communication plus their exploration of the comMCT model brought considerable insights. To us, following and studying this case-scenario illustrated that computer-science students are indeed open to this theme. They tend to perceive it as relevant and welcome (all too rare) opportunities like those described above to gain insight into multicultural teamwork.

#### D. Integration into Project Management Standards

The model addresses aspects of the three most renowned project management standards [26], [27], [28]. However, so far there are no comprehensive knowledge resources comparable to the comMCT model integrated into the standards. For example, the comMCT model touches to the knowledge areas communication management, risk management, and human resource management from the PMBOK® [26]. Hence, in a time of globalization, integrating multicultural communication into the above mentioned areas appears to be beneficial. As another example consider the competency-oriented ICB 4.0 [27]. In ICB, multicultural communication would supplement the ‘people competencies’ personal communication, relationships and engagement, leadership as well as teamwork. Alternatively, the topic multicultural communication could be added to one the closely linked, existing competencies such as teamwork.

For practical trainings we recommend scenarios similar to those described in the previous section, combining experiential learning with theoretical inputs. This is because ‘soft’ aspects cannot be learned properly in purely theoretic settings [10]. In addition to the above, trainings for project management professionals could propose specific practical challenges in given (optimally real) team-contexts.

#### VI. DISCUSSION

Overall, including the comMCT model as a resource into academic courses, as described in Sections B and C above, proved beneficial on two accounts. Firstly, as seen from the students’ reactions and responses, they were sensitized toward the theme of multicultural communication. They broadened their *knowledge* on this topic through actively exploring the comMCT model, relating it to their own *experience*, and providing feedback on it. They tended to perceive that the whole topic was complex, multidimensional, and omnipresent. Direct interpersonal relationships with people from different nations *as well as* some basic knowledge about multicultural teams would be indispensable for successful intercultural management and teamwork. Even through just a short investment of a course’s time, students tended to become more aware of both the benefits and challenges of cooperating across cultures. The interactive, student-centered exposure tended to motivate them to learn more on the topic.

Secondly, including the initial version of comMCT into courses let the instructors get valuable feedback regarding the model’s potentials as well as limitations and aspects to be improved. Intriguingly, like the experts in the expert evaluation of comMCT (see Section IV), students’ primary criticism addressed the fact that the information contained in the model was in part redundant and they didn’t like the repetition of facts regarding similar factors, even though they did appreciate the model to be complete. They made brilliant suggestions to introduce a more hierarchical structure with more abstract categories to subsume subcategories and capture information pertaining to all subcategories at the level of the more general category. They also suggested to search for attractive, user centered visualizations to help making the complex model conceptually more efficient and easier to overlook. Moreover,

some students proposed introducing personalized views of comMCT to allow for focusing on some aspects while blending out others that may be less relevant for a specific target group, function, role or project.

For practical life-long learning settings, similar scenarios like those described above could be used, in which project managers’ experiences are called upon and associated with relevant features of the comMCT model. Experiential learning through dialogue that connects participants’ experience of multicultural teams would enhance the depth of learning while breadth can be provided by the comprehensiveness of the comMCT model. Like in the academic context, improvements of comMCT such as a thoughtful reduction of redundancy and an increase in structure, visualization and personalization would improve the usability of comMCT. In addition, trainings for project managers could propose specific challenges in given, multicultural projects. This way they would allow for authentic experiences and potentially lead to user-specified case examples, comments, and add-ons to the model.

#### VII. CONCLUSIONS

Given the importance of professional or ‘soft’ skills in project work, in our view, the people-factor tends to be underdeveloped in computer science education [29]. Hence, with this paper we aim to contribute to compensating for this deficiency in the field of communicating effectively in multicultural teams. Scenarios on how instructors and students can work with comMCT - a web-based, empirically validated model of communication in multicultural teams - have been presented with the primary aim to inspire educators to enrich their courses by the open-source model we are offering.

Further research will be devoted to studying the integration of the comMCT model into real as well as academic projects. Moreover, the usability of the model will be improved by student-teams who will be participating in a project-based course on Human-Computer Interaction [30]. At the University of Vienna, we particularly welcome contributions from our international students, for instance in the form of bachelor/masters theses and team projects. These will help improving particular aspects of the comMCT model such as visualizations and personalization and will allow students to expand their subject-specific, interpersonal as well as research competence. We view such projects as examples of research-based learning, in which we partake as instructors, researchers, and, last but not least, co-learners and facilitators of the process of exploring very real aspects of socio-technical system [31].

Finally, future research should focus on the mid-term effects of integrating the comMCT model into academic education as well as life-long learning programs. If this work contributes to more satisfaction and success of multicultural teams [6], [32] we see its purpose as fulfilled.

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