Coaching Product Development Teams:
A conceptual foundation for empirical studies
Online Appendices B-F

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Appendix B: Etymological meaning of coach and related concepts

The terms coach, mentor, moderator, trainer, tutor, supervisor, and teacher all deal with the relationship between two entities where one provides knowledge, support, and assistance in doing some task to the other. The differences between the terms lie in the particular way in which the relationship between the entities is exercised. The definitions in Table 1 certainly show differences between the relationships. For example, a coach carries a coachee through an activity. There is a sense of being there when the activity is performed and providing help if necessary. In contrast, a mentor provides off-line mental or cognitive support that then needs to translate into practice.

What becomes evident is that each of these functions, whether coach, mentor, or supervisor, can be very useful to the effective transfer of knowledge and skill between people. Therefore, in this study, we would like to provide a more comprehensive understanding of the role of coaching as we perceive and practice it in order to improve its management.

Table 1: Definition of coach-related terms

Term	Definition	Source
Coach	1556, "large kind of carriage," from M.Fr. coche, from Ger. kotsche, from Hung. kocsi (szekér) "(carriage) of Kocs," village where it was first made. In Hungary, the thing and the name for it date from 15c., and forms are found in most European languages. Applied to railway cars 1866, Amer.Eng. Sense of "economy or tourist class" is from 1949. Meaning "instructor/trainer" is c.1830 Oxford University slang for a tutor who	http://www.etymonline.com/index.php?term=coach (11/23/2004). see also OED http://dictionary.oed.com/cgi/findword?query_type=word&queryword=coach&find.x=0&find.y=0&find=Find+wor

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	"carries" a student through an exam; athletic sense is 1861.	d
Mentor	"wise advisor," 1750, from Gk. Mentor, character in the "Odyssey," friend of Odysseus, adviser of Telemachus (often actually Athena in disguise), perhaps ult. meaning "adviser," since the name appears to be an agent noun of mentos "intent, purpose, spirit, passion" from PIE *mon-eyo- (cf. Skt. man-tar- "one who thinks," L. mon-i-tor "one who admonishes"), causative form of base *men- "to think" (see mental).	http://www.etymonline.com/index.php?search=mentor&searchmode=none (02/03/2005)
Moderator	1398, "ruler, governor," from L. moderator "manager, ruler, director," lit. "he who moderates," from moderatus (see moderate (adj.). Meaning "one who acts as an umpire" is from c.1560.	http://www.etymonline.com/index.php?search=moderator&searchmode=nl (02/03/2005)
Trainer (to train)	"instruct, discipline, teach," 1542, from train (n.), probably from earlier sense of "draw out and manipulate in order to bring to a desired form" (1375). The meaning "to travel by railway" is recorded from 1856. Trainer is recorded from 1598; trainee from 1841.	http://www.etymonline.com/index.php?search=trainer&searchmode=none (02/03/2005)
Tutor	1377, "guardian, custodian," from O.Fr. tutour "guardian, private teacher," from L. tutorem (nom. tutor) "guardian, watcher," from tutus, variant pp. of tueri "watch over," of unknown origin. Specific sense of "senior boy appointed to help a junior in his studies" is recorded from 1689. The verb is attested from 1592; tutorial (adj.) is recorded from 1742; as a noun it is attested from 1923.	http://www.etymonline.com/index.php?search=tutor&searchmode=none (02/03/2005)
Supervisor	1588, "to look over," from M.L. supervisus, pp. of supervidere "oversee, inspect," from L. super "over" (see super) + videre "see" (see vision). Meaning "to oversee and superintend the work or performance of others" is attested from c.1645; supervisor in this sense of "one who inspects and directs the work of others" is first recorded in 1454.	http://www.etymonline.com/index.php?search=supervisor&searchmode=none (02/03/2005)
Teacher (to teach)	O.E. tæcan (past tense and pp. tæhte) "to show, point out," also "to give instruction," from P.Gmc. *taikijanan (cf. O.H.G. zihan, Ger. zeihen "to accuse," Goth. ga-teihan "to announce"), from PIE *deik- "to show, point out" (see diction). Related to O.E. tacen, tacn "sign, mark" (see token). O.E. tæcan had more usually a sense of "show, declare, warn, persuade" (cf. Ger. zeigen "to show," from the same root); while the O.E. word for "to teach, instruct, guide" was more commonly læran, source of modern learn and lore. Teacher "one who teaches" emerged c.1300; it was used earlier in a sense of "index finger" (c.1290).	http://www.etymonline.com/index.php?search=teacher&searchmode=none (02/03/2005)

Appendix C: Stereotypes of coaching situations

The following list provides a detailed description for each stereotypical coaching situation employed in the repertory grid analysis. The order of items corresponds to the order the situations are listed in the WebGridIII input matrix.

1. **Moderator of a mailing list** – In a mailing list a group of people shares information open to everyone who subscribes to the list. The moderator (as list owner) controls who joins

the list and usually reads most of the messages – at least superficially. If any participant violates openly agreed-upon rules, the moderator can remove the person from the list.

2. **Moderator of e-learning** – The moderator of an e-learning environment manages the particular e-learning session. Tasks include distributing learning materials, operating the digital environment, and presenting learning contents, in addition to serving in a traditional instructor role as in any other teaching setting.

3. **Editor and co-authors writing a book** – The editor initiates a process that eventually leads to the publication of a book or similar product. The editor selects the book topic, invites several co-authors to contribute sections or chapters, and edits their contributions. The author also contributes to the outcome by personally writing editorial note, introduction or chapter.

4. **Coaching a football team** – The coach of a football (or any other sport) team first selects possible team members and trains the team on a regular basis. The coach participates physically in the training. Before and during a game/contest, the coach selects the players and guides their actions throughout the game/contest. The coach is also the team representative who deals with the other participants (opposing team members, logistics support personnel, referees) and the environment (transportation, stadium, impact of the weather, etc.).

5. **Instructor of a PBL class** – The instructor of a project-based learning (PBL) class performs the customary teaching functions such as presenting and distributing learning materials, teaching the actual lessons and grading assignments. The instructor also provides feedback on a scheduled basis and on a case-by-case basis when requested by a student. Other duties involving the organization and management of the course environment include dealing with project partners, financial issues and sponsor interactions.

6. **External coach in a PBL class** –External coaches voluntarily join a PBL class, serving as an interface between teacher(s) and student team as well as between project partners. The coach is not involved in the grading process, but rather represents a neutral resource the team might access at any time. Problems that the team would prefer not to discuss with the teaching team should be addressed to the external coach, at least initially, for an independent, impartial, but professional opinion.

7. **Consultant for BPR** – A business process reengineering (BPR) consultant is hired by the head of a company or other organization that seeks to reorganize its internal process(es). The consultant first analyzes the current process, gathers data by interviewing process participants and superiors, and then applies certain tools to organize and analyze the data. Finally, the consultant provides recommendations to company management, possibly including all BPR participants.

8. **Design consultant** – The design consultant offers professional expertise to a company's design/product development department by applying product design tools and methodologies to the design of a particular product, especially in early portions of a project. In typically short sessions, the consultant teaches the staff about focused topics that move the process forward. The consultant may also be engaged later in the process, for example in user testing and prototype iteration.

9. **Parent-small child relationship** – Some of the most important aspects of parenting a 3-year old child involve protecting against possibly harmful environmental influences, teaching appropriate behavior and imparting as much individual experience/expertise to the child as possible. A strong emotional relation binds parent and child. The parent is the most important point of reference for the child.

10. **Professional coach over the phone** – The coachee, i.e., any individual, relies on the process-related support (e.g. task planning, reflections on professional and private issues) that a professional coach offers. A face-to-face meeting might be valuable in establishing a close working relationship between coach and coachee. The coaching process addresses specific needs of the coachee and is focused on the procurement of best practices to solve those problems. This phase is carried out mainly over the phone. Coach and coachee split after the coachee is able to address the problem independently and without the coach's aid.

11. **Student coaching freshmen** – A senior-year student volunteers some time to introduce incoming freshmen to the new and unfamiliar university environment during their first year of studies. Information about courses, preparation for exams, finding internships are typical topics. Training is conducted in presentations as well as in team-building exercises. Furthermore, joint activities are organized. The coach goes through an appropriate training before starting coaching.

12. **Moderator of a discussion** – A discussion moderator verbally guides invited speakers through a – to some extend artificial – conversation. There is typically an audience. The moderator sequentially addresses the participants to state their opinions/expertise on a certain, predefined discussion topic and tries to equalize the amount of time each speaks. Besides, the moderator has to maintain a certain code of conduct during the session, yet has to elicit as much polarization as possible to keep the discussion controversial. In many cases, the discussion is also meant to have an educational and informative aspect for the audience.

13. **Librarian** – The librarian collects knowledge or expertise and transforms it into some kind of storable information for the library. A librarian also manages and organizes the captured information and makes it available to anybody who requests it. The coachee addresses the librarian with a more or less specific search query. The librarian either teaches the coachee how to efficiently seek the information in the database or conducts this process for the coachee.

14. **Extreme coaching** (open source programming phenomenon) – In the open source software development community, many individuals are gathered in global, virtual environment due to some mutual interest in developing a particular piece of software. Depending on each individual's experience and expertise, anybody can become coach as well as coachee. The single coachee addresses either a single coach or the whole community to elicit help on certain software or hardware related problem. The response can come from one or many individuals. However, the quality and quantity of the answers are not necessarily reliable.

15. **Pilot trainee and instructor** – During the extensive education of a pilot trainee, the instructor imparts theoretical as well as practical knowledge in how to properly fly an airplane of a certain kind. Especially in the practical and possibly dangerous flight

lessons, the instructor constantly monitors the pilot trainee's actions and behavior. The instructor can overrule the trainee's actions at any time in order to preserve safety.

16. **Judge** – A judge is called in when two disputing individuals or two disputing parties seek an objective, law-compliant judgment. The parties may consist of several individuals and if necessary may be represented by lawyers. The judge receives information from both sides, reviews the situation, and after deliberating the facts, including existing laws, comes to a decision. The result is obligatory for the opponents to follow unless one party appeals to a higher court.

17. **Friend giving advice** – In certain and sometimes critical situations, the coachee can address – or is addressed by – a friend (coach) to receive either immediate help, moral support or some piece of advice, all of which are meant to be as truthful and pertinent as possible to the best of the coach's knowledge. The establishment of a friendship takes time and is built up through shared experiences and emotions. It leads to mutual and close understanding and trust between the coachee and the coach. A friend is informed about the coachee´s situation and condition and keeps an eye on him/her.

18. **Physician and patient** – The patient (coachee) suffers from either psychological or physical pain or disease and needs more or less urgent professional help from the physician. During typically short sessions, the coachee is being examined, treated, medicated and/or counseled by the physician. The interaction can last over a long period, however. The physician is obliged to help the patient in case of an emergency, which makes the patient highly dependent on the physician.

19. **Commercial service** – Any common service, for example a haircut, directory assistance, cleaning, or copy shop service is characterized by its widespread availability. The coachee can choose between several providers taking personal preferences, habits or biases into account. No close relationship is established. The coachee seeks fast, uncomplicated but competent support for as little expense as possible.

20. **Tax consultant** – A tax consultant counsels either an individual or an organization (coachee). Both provide the tax consultant (coach) with the information needed to remain fiscally responsible. This information is to a certain extent critical to the coachee and requires the coach to sign to a non-disclosure-agreement. The coach-coachee relation is therefore close and rather long term orientated.

21. **Priest in a confession** – An individual confession happens in private between the priest (coach) and the believer (coachee). For example, in the Christian Church, God has the power to provide forgiveness to people who want to be absolved of their guilt. In the confession, the coachee talks about the sin and the desire of reconciliation with God and the people. The priest awards forgiveness for the coachee´s guilt and implicitly enters into to a non-disclosure-agreement about this episode.

22. **Conductor of an orchestra** – During a concert the conductor provides visual information about the rhythm and the intonation of the piece played. The orchestra is supposed to follow those rules but is not obliged to do so. In case an individual musician is very familiar with the piece, he/she may abandon the conductor's advice as long as the rhythm and notes are correct.

23. **Professor and Ph.D. student** – The Ph.D. student (coachee) decides to do research in a certain realm of interest. Subsequently, the student contacts a professor (coach) who is an expert in that domain to provide academic advice. Together, the Ph.D. student and the professor define a specific research task. The Ph.D. student then conducts this research independently but receives feedback and, if needed, correction by the professor on a regular basis.

24. **Coach for a CEO** – Similar to situation 10, the coach for a Chief Executive Officer (CEO) of a company is a professional. The coachee, who has large-scale responsibilities within the company or organization, consults with the coach regarding professional and private matters. The coach provides best-practice ways – that may be adapted to the coachee´s individual situation/ condition – to solve problems, gives objective feedback and serves as a contact person regarding any problem the coachee cannot or does not want to address with company associates. Due to the sensitive nature of the issues involved, the coachee carefully selects the coach. The collaboration tends to be long term.

25. **Any knowledgeable colleague** – The coachee addresses the coach (colleague) concerning mostly work related topics, yet this can include personal issues. The coachee knows the coach in the context of the professional environment, but at this level, the relation is close to some extent. The coachee perceives the coach to have extensive knowledge, experience or information concerning the issues at hand.

26. **Government consultant** – The coachee (government) has large-scale responsibilities for and influence on issues concerning individual and global matters. Due to that the extent of this activity, the coachee cannot oversee every detail and therefore engages specialized consultants (coaches) to collect large amounts of data on a certain issue. The consultant is also asked to condense, present and sometimes interpret the data and to make it accessible to and easily usable by the coachee.

27. **Space shuttle crew and mission control** – During a space mission the Shuttle crew is remote and largely dependent on Mission Control, situated in a control center on earth. Vital data is downloaded from the Shuttle to Mission Control. Communication, technical and scientific data are exchanged on a bidirectional basis. In case of an emergency, the safe return of the crew has the highest priority. All participants are selected carefully, are experts in their individual domains as well as in the system, undergo extensive (collective) training and share a mutual understanding and language.

28. **Addiction or marriage counseling** – The coaching situation is characterized by a very critical situation and condition concerning psychological and physical issues that the coachee is experiencing. Both the drug addict and the couple undergoing serious relationship problems are coachees who need rapid and professional help. The coachee addresses the coach, or is forced to do so. The coach-coachee relation at first is characterized by caution, and both coach and coachee pay careful attention to the other. Assuming that the coachee really wants to solve the problem, the coach-coachee interaction has to build trust to bring out the deeper reasons for the coachee´s situation and condition.

29. **Police officer monitoring an intersection** – In daily traffic situations, road users (coachees) are guided by one or more police officers to safely cross an intersection or any other traffic obstacle. The police officer (coach) visually pilots the coachee through any

situation that could possibly endanger the coachee or any other person who happens to be in the area. Since the instructions are conveyed visually, the coach and coachee are required to pay careful attention to each other. In case the coachee, either consciously or unconsciously, violates the rules, the police officer has the authority to call the coachee to account.

30. **Nurse giving advice to disabled people** – Due to some impairment, the coachee is not able to live entirely independently. The attendant or nurse (coach) provides the coachee with everything necessary to have a high-quality lifestyle under the circumstances. That includes physical and moral support. The coach's activities range from meal preparation and cleaning services to minor medical treatments and brief but personal talks. The relation normally lasts a long time since very personal and intimate issues are concerned. Over time, coach and coachee may develop a personal friendship as well.

31. **Company financial controller** – Large companies or organizations (coachees) have to keep track of their financial affairs for legal and economic reasons. The financial controller (coach) is part of a department within the company dedicated to collecting and processing the company's financial data on an on-going basis, and then providing status information on demand to company officers and other employees. The extent, nature and granularity of the information the financial controller provides are determined by the role and seniority of the employee in the company.

32. **Board of directors coaching a startup CEO** – The Chief Executive Officer (CEO) of a rather small team of employees has comprehensive responsibilities, and as coachee, is guided and monitored by a group of business-savvy coaches (board of directors), who may not necessarily be familiar with the company's product niche. The coaches are at a higher level, hierarchically, and may have invested financially into the startup company as well. On the one hand, the coaches want the coachee to succeed (and support the coachee with their knowledge, expertise and/ or influence in other domains), but on the other, they will also withdraw support from the coachee in case they do not receive (or expect to receive) a return on their investment.

33. **Car dealer** – The customer (coachee) wants to buy a used or new car, and consults with a car dealer (coach), talking about specific needs, personal preferences and biases. To some extent, this situation is similar to situation 19 since both involve the availability of multiple car dealers (coaches). The coach has the strong desire to sell one or several of his/her products with as large a margin as possible. The reverse is true for the coachee, who seeks to pay as little as possible. Bargaining drives the whole situation.

Appendix D: Stereotype coaching situations in product design

Many of the aforementioned stereotypical situations translate directly into product design situations:

1. Editor with co-authors working on a book or single paper translates into co-authoring some PD document (e.g., requirement specification).

2. Consultant that assists a company in its business process reorganization

3. Expert on quality design giving workshop to a company and further being consulted on the matter from now on.

However, there are some situations that do not seem to be related to PD yet close examination reveals similar design situations:

1. Parent-child relationship could exist in family businesses when parents introduce their children into the organization.

2. Extreme coaching - open source phenomena may exist in an organization with a strong community of practice (COP) formed internally.

3. Judge might correspond to a regulatory agency (e.g., FDA) that demands that the process and product adhere to some standards.

4. Priest and a confession could also be translated into PD scenario: A young engineer is hired by a company and the department's manager tells him in the first meeting: you have 6 months to learn your job. Anything you do in this period including mistakes do, not count. The only thing mandatory is that you talk to me about your mistakes. I'll teach you what you need to know to avoid them.

   IDEO, a famous Palo Alto design firm, keeps its staff creative by removing bureaucracy, encouraging cross-fertilization of ideas, and allowing its employees "to fail in a culture of try it, fix it, try it again, and learn from the experience (Perry 1995, p. 16)."

Appendix E: Dimensions of coaching situations

The following list provides a detailed description for each coaching dimension employed in the repertory grid analysis. The order of items corresponds to the order the dimensions that are listed in the WebGridIII input matrix. Each item in the list has the following structure: *name of the dimension, poles, brief describing explanation.*

1. **Scale of team activity: small – large**: Describes the extent to which the coachee is involved in collaborative teamwork while the actual coaching takes place. This can range from small (e.g., a personal relation/ interaction between two individuals) to large (e.g. interactions in a large team).

2. **Teamwork setup: educational – industrial:** Describes the main focus of attention of the coaching activity. This can range from educational (e.g., any situation for which the intention is to impart knowledge or generate practical experience to the participants) to industrial (e.g., any situation for which the intention is the creation of monetary value).

3. (a) **Potential cost of coaching activity failure: low – high**: Describes the potential cost for coach, coachee and/or community/society in case the coaching activity fails to achieve its main goal. This can range from low to high. The comparison should be conducted relative to the presented situations.

   (b) **Resources for conducting coaching: low – high**: Describes the resources (mainly financial) needed to conduct the actual coaching activity. This can range from low to high. The comparison should be conducted relatively to the considered situations.

4. **Human risk of coaching activity failure: low – high:** Describes the potential risk – i.e., to cause physical and psychological harm to coach, coachee and/or the human environment – in case the coaching activity fails to achieve its main goal. This can rank from low (e.g., no possible physical/psychological harm at all) to high (e.g., possible life threatening physical/psychological harm).

5. **Starting stage of coaching: detailed – pre-conceptual:** Describes the moment when the initial coaching takes place with reference to when the coachee first encounters the activity being coached. "pre-conceptual" stage is early in the project, and the coach is assisting the coachee in understanding how to approach the problem. "detailed" stage refers to the time when a coachee is clear on the problem or project task and is looking at ways to solve it.

6. **Trigger to introduce coaching: enforced – requested**: Describes the characteristics of the actual impetus that initiates the coaching activity. This can rank from enforced (e.g., the coach or another authority forces the coachee to be coached) to requested (e.g., the coachee directly addresses the coach or any other point of contact to receive coaching).

7. **Chronological mode: asynchronous – synchronous:** Describes the chronological relation between the coach's and the coachee´s activity. This can rank from asynchronous (e.g., coach and coachee do not act at the same point in time and communicate through some kind of medium such as email to convey information to overcome the time shift) and synchronous (e.g., coach and coachee act and interact at the same point of time).

8. **Monitoring style: thermostat – over the shoulder:** Describes the way that the coach oversees the coachee´s actions and behavior and how the coach collects and processes information from and toward the coachee. This can rank from thermostat like behavior (e.g., the coach only intervenes when the behavior or the situation of the coachee over- or under-runs predefined boundary conditions) to over-the-shoulder like behavior (e.g. the coach constantly monitors the coachee and figuratively looks over the coachee´s shoulder at all times).

9. **Object mediating coaching: limited – rich:** Describes the communication options available to coach and coachee in the actual coaching situation to mediate the information they want to exchange. This can rank from limited (e.g., unstable connection with low bandwidth) to rich (e.g., permanent solid connection with high bandwidth).

10. **Level of involvement: restricted – comprehensive:** Describes the interaction between coach and coachee especially regarding the way the coach is involved in the coachee´s process/situation. This can rank from restricted (e.g., the coach only provides verbal/visual cues like questions, statements and gestures) to comprehensive (e.g., the coach is deeply involved in the coachee´s process, sharing the task load).

11. **Content delivered by the coach: poor – rich:** Describes the quality and the quantity of the content the coach contributes to make the coachee achieve the task at hand. This can rank from poor (e.g., the coach contributes very little maybe because the job is to oversee the process) to rich (e.g., coach and coachee actually work together on a joint work).

12. **Type of involvement: reactive – proactive:** Describes the engagement of the coach in the coaching process. This can rank from reactive (e.g., the coach waits until the coachee faces an impasse; this can be due to educational or other reasons) to proactive (e.g., the

coach anticipates future developments of the coachee and/or situation and intervenes before these developments interfere too much with the coachee´s process).

13. **Duration: short – long:** Describes the length of the time frame during which the coachee and the coach interact. This does not necessarily refer to a single session length but the complete time frame during which one or several coaching sessions can take place. The dimension can be ranked from short (e.g. one single coaching session lasting for maybe one hour) to long (e.g. several coaching sessions distributed over a long period of time).

14. **Availability of second opinion: yes – no:** Describes the coachee's opportunity to consult a second opinion from another coach. This can rank from one (e.g., only one coach is involved in the process) to many (e.g. many individual coaches are involved in the process).

15. **Number of coaches: one – many**: Describes the number of coaches involved in the coach-coachee interaction. This can rank from one (e.g., only one coach is involved in the process) to many (e.g., only one coachee is involved in the process) to many (e.g., many individual coachees are involved in the process).

16. **Number of coachees: one – many:** Describes the number of coachees involved in the coach-coachee interaction. This can range from one (e.g., only one coachee is involved in the process) to many (e.g., many individual coachees are involved in the process).

17. **Emotional relationship between coach and coachee: low – high**: Describes the emotional extent to which coach and coachee are connected to each other. This can rank from low (e.g., a coach-coachee relation that does not involve any particular human emotion regardless of whether this emotion is positive or negative) to high (e.g., a coach-coachee relation that does include particular human emotion regardless of whether this emotion is positive or negative).

18. **Final decision made by: coach – coachee**: Describes the decision process in the coach-coachee relation. In any given case it is not important who – either coach or coachee – makes the respective decision, but who would have the final say in case the coach and coachee do not agree upon the matter. This dimension can be ranked from coach (e.g., the coach has the final word and could overrule the coachee) to coachee (e.g., the coachee has the final word and could overrule the coach).

19. **Size of coachee entity: one person – entire organization**: Describes the size and organizational complexity of the coachee. This can rank from one person (e.g., the coachee is involved in the coaching process as a single individual) to an organization (e.g., the coachee is involved in the coaching process as a member of a complex and extensive network of individuals).

20. **Professional level of coachee: novice – expert**: Describes the level of professionalism of the coachee concerning the task at hand. Both educational training as well as practical experience are considered. The dimension can be ranked from novice (e.g., the coachee has no formal or informal knowledge about the task) to expert (e.g., the coachee underwent an extensive education and has considerable practical experience in this type of task).

21. **Coaching experience of the coachee: novice – expert:** Describes the extent to which the coachee already has theoretical knowledge or practical experience in being coached by a

coach. This can rank from novice (e.g., the coachee has neither theoretical knowledge nor practical experience in being coached) to expert (e.g., the coachee has extensive theoretical knowledge and practical experience in being coached).

22. **Coach acceptance by coachee: weak – strong**: Describes the extent to which the coach is accepted by the coachee. This includes for example how deep the coachee integrates the coach in the task process and how much information the coachee shares voluntarily. The dimension can be ranked from weak (e.g., the coachee does not accept or integrate the coach's advice at all, the coachee does not share any information voluntarily) to strong (e.g., the coachee accepts and integrates a lot of the coach's input, the coachee voluntarily shares all relevant information with the coach).

23. **Coachee-coach dependency: independent – dependent**: Describes the extent to which the coachee is dependent on the coach regarding the task or the process the coachee follows. This can rank from independent (e.g., the coachee is not bound to or does not need a particular coach to perform the task) to dependent (e.g., the coach is bound to or does need a particular coach to perform the task).

24. (a) **Level of trust coachee has in the coach: low – high**: Describes the extent to which the coachee trusts in the coach's behavior in the coaching process. This can rank from low (e.g., the coachee does not trust the coach due to some subjective or objective reason) to high (e.g., the coachee completely trusts the coach due to some subjective or objective reason).

(b) **Expected evolution of trust: low – high:** Describes the extent to which trust in the coach-coachee relation ship might develop over time. This can rank from low (e.g., the level of trust stays the same over a long period of time) to high (e.g., the level of trust evolves over a long period of time). The dimension assumes a positive trust evolution.

25. **Coach perspective: same level – higher level**: Describes the perspective from which the coach participates in the coaching process. This can rank from same level (e.g., coach and coachee have the same perspective on the coachee´s task/process regarding granularity and abstraction) to higher level (e.g., the coach has a higher perspective on the coachee´s task/process; since the coach is not involved so deeply, it is easy to maintain a more objective and abstract perspective of what the coachee is doing).

26. **Possibility of team modification: yes – no:** Describes the extent to which the coach can modify the coachee team. This can rank from yes (e.g., the coach may change the coachee entity) to no (e.g., the coach may not). This dimension does not focus on whether the coach can choose or not choose to coach.

27. **Coach training: none – formal**: Describes the extent to which the coach underwent theoretical training in being a coach before actually conducting coaching activities. This can rank from none (e.g., the coach has no theoretical education in being a coach) to formal (e.g., the coach participated in appropriate education and gathered the necessary theoretical background).

28. **Task-related knowledge of coach: novice – expert**: Describes the level of professionalism the coach has in the coachee´s task/process. This can rank from novice (e.g., the coach does not have any practical or theoretical knowledge in what the coachee

is doing) to expert (e.g., the coach has extensive in the coachee´s task and/or the process the coachee goes through).

29. **Coach's reason to participate: volunteer – job definition**: Describes the coach's motive and reason for participating in the given coaching process. This can rank from volunteer (e.g., the coach participates due to personal reasons and motivations – there is no formal constraint that causes the coach to participate) to job definition (e.g., the coach's professional job description includes coaching, making it obligatory to participate).

30. **Practical coaching experience of the coach: novice – expert**: Describes the practical experience the coach already gathered in coaching before being involved in the given coaching situation. This can rank from novice (e.g., the coach hardly ever performed as a coach and, as a result, has no practical experience) to expert (e.g., the coach has been involved in multiple coaching situations and therefore has collected extensive practical experience).

31. **Coach's responsibility concerning product: little – a lot**: Describes the extent to which the coach is responsible of what the product of the given task is like regarding end-product quality and/ or quantity. This can rank from little (e.g., the coach is not responsible for the actual outcome) to a lot (e.g., the coach is fully responsible for the actual outcome).

32. **Coach's responsibility concerning process: little – a lot:** Describes the extent to which the coach is responsible for task/process quality and/or quantity. This can rank from little (e.g., the coach is not responsible for the actual performance of the process) to a lot (e.g., the coach is fully responsible for the actual performance of the process).

33. **Influence and control: negligible – high**: Describes the extent to which the coach has conscious and/or unconscious influence and/or control over the coachee. This can rank from negligible (e.g., the coachee´s decisions are not influenced by the coach) to high (e.g., the coachee´s decisions are highly influenced and controlled by the coach).

34. **Trust coach requires from coachee: none – comprehensive:** Describes the extent to which the coach requires trust from the coachee to conduct the actual coaching process. This can rank from none (e.g., there is no trust needed between coachee and coach to perform the coaching process) to comprehensive (e.g., the coachee needs to trust the coach in a comprehensive way to conduct the actual coaching process).

35. **Integration of coach in coaching networks: low – high**: Describes the extent to which the coach is integrated in coaching networks (professional community) regarding the continuous exchange of information concerning developments in coaching in general. This can rank from low (e.g., the coach does not participate in such a network or exchange information with other coaches) to high (e.g., the coach is integrated in a large coaching network and extensively exchanges information with other coaches).

Appendix F: An example of one design problem scenario (DPS)

DPS		Team "Aloha - Surfboard Structural Dynamics" has to deliver a first draft of the final prototype in two days. The team made interesting changes to the board structure during the last two quarters. Since these changes - according to the statement of an expert engineer - promise to help minimize the structural deformation, the team needs to obtain quantitative analysis results, e.g., from a FEM simulation. Without such a simulation, it will be difficult to convince anyone in the teaching team of the innovative nature of the board design for the final prototype. Unfortunately, no one on the student team is an FEM expert. However, the coach has extensive theoretical and practical expertise in the field.
coach reactions	CR (a) **(f)**	The team does not consider the FEM simulation to be too important. However, the team asks the coach for help with the given problem. The coach decides to provide the team with a workstation that has an FEM software package installed on it, and offers them some minor help during the software usage.
	$Q_{CR(a)}$	Would your coach behave like this? ☐ strongly agree ☐ agree ☐ neutral ☐ disagree ☐ strongly disagree
	CR (b) **(m)**	The team talks to the coach about this problem. The coach does not see any possibility to reach the goal of a serious simulation in the short time left and suggests presenting the prototype without any simulation. The coach further encourages the team not to worry too much about that and affirms that the teaching team will not insist on an FEM simulation if the students present a promising prototype.
	$Q_{CR(b)}$	Would your coach behave like this? ☐ strongly agree ☐ agree ☐ neutral ☐ disagree ☐ strongly disagree
	CR (c) **(i)**	The coach realizes the problems of the team and initiates an immediate team meeting. In that meeting the coach teaches the team how to use one particular software tool that does simple dynamic FEM simulations. During the simulation itself, which is conducted by the team, the coach answers any questions about the software.
	$Q_{CR(c)}$	Would your coach behave like this? ☐ strongly agree ☐ agree ☐ neutral ☐ disagree ☐ strongly disagree
	CR (d) **(c)**	The team addresses the coach to help them with the simulation. Due to the team's urgent and critical need, the coach agrees to help, takes the CAD model generated by the team and makes a simple but meaningful dynamic simulation. The next day the coach presents the team with the results and answers all the questions the team has.
	$Q_{CR(d)}$	Would your coach behave like this? ☐ strongly agree ☐ agree ☐ neutral ☐ disagree ☐ strongly disagree
	CR (e) **(s)**	The coach realizes the problems of the team and initiates a team meeting. To that team meeting the coach brings along three software packages that would allow them to make a relatively easy and quick dynamic FEM simulation. The coach tells the team about some of the software characteristics of each package, outlines the general rules one should follow to receive reasonable results, tells them where they can find additional information and then leaves any further action to the team.
	$Q_{CR(e)}$	Would your coach behave like this? ☐ strongly agree ☐ agree ☐ neutral ☐ disagree ☐ strongly disagree