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A Description of a Validated Effective Teacher-Training Workshop for Medical Residents

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Abstract - A teacher-training program for residents was designed and piloted in the St. Elisabeth Hospital in Curaçao, Netherlands Antilles. The program comprised of six modules namely: effective teaching, self-knowledge and teaching ability, feedback, assessing prior knowledge, trouble shooting and time management.

Method: Instruction was provided during a two-day workshop with eight hours instruction time per day. Residents in the first three years of training participated, and the instructors were experienced clinicians. Lectures, group discussions, case simulations, video presentations and role-plays were the forms of instruction.

Results: Using standardized questionnaires, the participants rated the quality of the workshop highly. They considered it to be a feasible and appropriate educational intervention and that it had a positive impact on their teaching skills.

Conclusion: This workshop was developed based on careful analysis of medical residents' perceived educational needs and systematically implemented and evaluated. The results show that it is a suitable and effective educational intervention

There is an ongoing campaign in medical education aimed at improving the didactic skills of clinical teachers. Although specialist physicians (i.e. clinical teachers) are primarily responsible for undergraduate clinical education, medical residents have increasingly been found to contribute to this process.[1-4] It is known that clinical teachers and medical residents benefit from training in teaching skills,[5-11] and it is argued that medical residents in particular, benefit from participating in the teaching process itself.[12,13] The way students, residents and specialist physicians perceive the teaching roles of medical residents have also been investigated, and there is consensus that residents' teaching skills can, and need, to be improved.[14-23] Educational programs to achieve this have been advocated,[18,19, 21-23] as has the incorporation of teaching skills in residency training.[19, 23] Furthermore, there are reports in the literature of noticeable improvements in the clinical proficiency and teaching skills of residents who participated in such training programs.[5-8]

In the Netherlands, medical residents are known to participate actively in the education of their peers and medical students. Their training however, does not contain specific teacher training programs. Earlier studies we conducted on the teaching roles of Dutch medical residents showed that they, and specialist physicians, perceived clinical teaching as beneficial for their individual professional development and knowledge, as well as for that of the students they taught. These studies also revealed that despite the perceived benefits of teaching by medical residents, the educational climate of many institutions do not adequately support clinical teaching. Furthermore, residents and their supervisors desired specific training in teaching skills, as well as more time for teaching.

Based on these findings, we set out to develop an intervention that would improve the teaching ability of medical residents in the clinical workplace. Specific educational needs as perceived by specialist physicians and medical residents were identified and the provided recommendations were used to design a two-day teacher training workshop. The workshop was implemented and its impact on the teaching skills of medical residents was subsequently investigated. Medical students used standardized questionnaires to evaluate the teaching abilities of the residents prior to, and after participating in the teacher-training workshop. The results showed significant positive changes in the teaching ability of those who participated in the workshop compared to those who did not.[24] In this article, we provide a description of the validated teacher training workshop for medical residents that was designed.

Development of the Training Program

Design - Four medical educationalists, of whom three were also physicians, and one medical student con-

Table 1. List of skills and cognitions medical residents should possess in order to teach effectively

Residents' Suggestions[3] (Busari *et al.*, 2002)	Specialists' Suggestions[16] (Busari *et al.*, 2003)	Review of Literature
Be able to present information clearly ***(cognitive skill)***	Set clear teaching objectives and develop problem-solving skills ***(cognitive skill)***	Understand the fundamental process of knowledge acquisition ***(cognition)***
Be able to transfer knowledge effectively ***(cognitive skill)***	Be able to transfer knowledge effectively ***(cognitive skill)***	Be able to transfer knowledge effectively ***(cognitive skill)***
Be able to explain difficult concepts to students ***(cognitive skill)***	Stimulate students to learn e.g. by interacting better with them ***(affective skill)***	Understand how students learn ***(cognition)***
Be able to provide feedback to students ***(cognitive skill) + (afefctive skill)***	Be able to provide appropriate feedback easily ***(cognitive skill) +(affective skill)***	Understand the different forms of knowledge ***(cognition)***
	Perform and teach clinical skills effectively e.g. history taking and physical examination ***(psychomotor skill)***	Know how to apply different forms of knowledge ***(cognitive skill)***

structed the program. Three sources of information were used to define the content of the workshop, namely 1) medical educational research that involved needs assessment analysis, 2) experts' opinions and 3) review of educational theory.[25] We pooled information from theories on knowledge acquisition and transfer and identified cognitions and skills (cognitive, affective and psychomotor-perceptual) that we considered essential for improving residents' teaching abilities (Table 1). A total of 14 concepts were identified as important from the different sources. The information was merged and clustered together based on similarity. This resulted in the 11 concepts that were used in defining the six teaching modules of the workshop. The themes of each module represented the desired learning outcomes of the program namely: 1) Effective teaching, 2) Self-knowledge and teaching ability, 3) Feedback skills, 4) Assessing prior knowledge, 5) Trouble shooting, and 6) Time management.

Planning - Planning involved the selection of an appropriate training format, instructors, participating departments and residents, and logistical considerations. A literature search was conducted to identify appropriate training formats. The literature provided the strongest evidence of effectiveness for multi-component instruction methods, such as seminars and workshops.[25,26] We favored a workshop because it: 1) would allow the active participation of the residents, 2) is cost-effective, 3) is a familiar format for residents, and 4) could be held outside the wards, thereby reducing interference from the residents' work.[25] Instructors were educational experts and clinical staff, which provided a desirable mix of educational expertise and credibility. This also approximated the residents' idea of a good teacher: a physician who is also a teacher with appropriate training and experience.[13] The audience was comprised of all residents involved in undergraduate teaching, that is residents in all the major clinical disciplines, were eligible for participation. We focused on residents in the first three years of residency, because teacher training early in residency has been recommended by residents as well as others.[15,25] The choice of a two-day workshop with eight hours instruction time per day was based on positive experiences from similar workshops.[27]

Implementation of the Training Program

In 2002, a pilot study funded by the Netherlands Antilles Foundation for Higher Clinical Education was conducted at the University of the Netherlands Antilles, Curaçao. Its aim was to assess the suitability and feasibility of a teacher-training workshop for residents. The participants were graduates from Dutch medical schools who were undergoing pre-residency training in the major specialties (internal medicine, surgery, pediatrics, obstetrics and gynecology) at the St. Elisabeth Hospital, Curaçao.[28] The five workshop instructors were physicians and teachers in the departments of pediatrics (2), neurology (1) and internal medicine (1), and a pediatric resident, who was an educationalist and one of the workshop developers. The workshop was expected to achieve the desired learning outcomes through:

- acquainting the residents with the relevant theory of learning, forms of knowledge, and the process of knowledge acquisition and transfer;
- highlighting the profile and position of residents in

the educational process;

- providing residents with basic educational skills;
- training the residents how to employ those skills;
- demonstrating how those skills (can) facilitate learning.

The program and study material were sent out two weeks before the workshop. On day one of the program a brief orientation on the structure and objectives was provided. Three modules were covered on each day of the workshop. The workshop began at 0830h and ended at 1500h. The duration of the program on both days was shorter (6.5 hours/day) than the initial eight hours instruction time per day that was planned. This was due to certain modifications that were later found necessary during the implementation of the program. The instruction methods consisted of lectures, discussions, case simulations, video presentations and role-plays. Below a description of the intended learning outcomes and teaching strategies for each module is given.

1. Effective Teaching

Intended learning outcome - Acquaint the medical residents with the concept of teaching and learning, and also with the principles of effective teaching.[29] It was also designed to familiarize them with important concepts such as learning within a context and how to facilitate student learning and participation within the leaning context.[30]

Teaching strategies:

- A 20-minute lecture illuminated the concepts of teaching and the importance of the educational setting (classroom, ward, consultation room).
- The concept of patient-based teaching was used to illustrate "teaching in context", for instance how bedside teaching can facilitate student-learning.
- Skills that might improve teaching were addressed. The residents reflected on skills and prior knowledge that facilitate teaching in an interactive manner. They then formulated new skills they considered essential for effective teaching.
- The importance of student autonomy was shown. For example, how acknowledging students as adult learners motivates them to learn.[30] The residents received instruction (10 minutes) on how to identify and acknowledge their individual limitations. A 20-minute demonstration illustrated how honest and open rapport with students reflects goodwill and creates a favorable atmosphere.

2. Self-knowledge and Teaching Ability

Intended Learning Outcome - The module teaches methods of improving residents' teaching abilities. It highlights factors that can facilitate student learning. For example, the "closeness" of students and residents can influence learning. That is, residents and students working together on the wards could influence teaching and learning positively.

Teaching strategies:

- A 10-minute lecture on how fundamental concepts of educational theory can improve teaching. The process of knowledge organization and compilation was illustrated with the aid of relevant educational theory.
- Following a 5-minute video presentation, the residents discussed for 20 minutes surface and deep learning. A 10-minute lecture presented different approaches to learning and their impact.
- A 20-minute discussion of factors, such as clinical ability, pedagogical ability, personal qualities (Table 2), and how they can improve teaching ability.

Table 2. Factors that can improve teaching ability

Clinical Abilities	Pedagogical abilities	Personal qualities
- Good clinician - Up to date theoretical knowledge - Up to date clinical knowledge - Holistic approach - Flexible - Integration of preventive and curative aspects - Critical and analytical	- Active participant in teaching - Individualises teaching approach - Identifies strengths and weaknesses	- Enthusiasm for work - Able to assess own strengths and weaknesses - Self improvement - Warm and respectful - Listens - Expresses own emotions appropriately - Interacts with others - Manages stressful situations - Gets support when necessary - Balances personal and professional life

Modified from Cote, 1993[17]

3. Feedback

Intended Learning Outcome - Feedback informs learners about their progress and affects the acquisition and transfer of knowledge. In this module, the concept of feedback is redefined. The residents experience giving and receiving feedback. They understand why positive or negative feedback should be specific and frequent, why it should occur formally and informally, and also include explanations and suggestions for improvement

Teaching strategies:

- A 20-minute lecture showed the value of appropriate feedback. The importance of the following concepts which can facilitate effective feedback were also covered:
  - the balance between positive and negative feedback;
  - why and how honesty in providing feedback can create an atmosphere for open communication and facilitate learning;
  - clarity, defined as formulating clear objectives at the onset of the discourse with students;
  - the importance of a partnership with the students.
  - A 10-minute video presentation showed positive and negative ways of providing feedback. A 60-minute session involving discussion and role play addressed ways of:
  - identifying positive and negative forms of feedback;
  - providing balanced feedback to one another;
  - exploring and identifying students' expectations and agreeing upon common learning goals.

4. Troubleshooting

Intended Learning Outcome - In this module residents re-examine problems that arise in the clinical setting. They get acquainted with how to effectively classify problems. For example, problems arising due to conflicts between what students are expected to do and what they actually do. Distinctions are made between problems that could be anticipated, that is, students arriving late for clinical meetings, and those problems that could arise unexpectedly, for example, a student losing motivation following negative feedback. The residents are expected to be able to identify, acknowledge and recognize the cause of a learning problem, and select the appropriate intervention to resolve it on completion of this module.

Teaching strategies:

- The definition of terms (e.g. performance problems) and distinctions between measurable and observable problems were provided in a lecture and discussion session (15 minutes). Four steps in troubleshooting were discussed (20 minutes each):
  - Problem identification - By reflecting on their own experiences, residents discussed ways of detecting problems in students' performance.
  - Problem acknowledgement - Problems can be professional (clerkship-related) or personal (not clerkship-related) and behavioral and/or educational in nature. Acknowledging a problem entails identifying the nature of the problem and accepting it with the aim of finding a solution.
  - Identifying the cause - This can be done by answering the following questions: is the problem due to:
    1. an absent or incomplete professional behavior, or a skill or behavior that was incorrectly learnt or taught (professional + behavioral);
    2. a skill or knowledge that has diminished with lack of use and time (professional + educational);
    3. a non-educational cause affecting knowledge or skills, like health or family issues (personal + educational);
    4. a non-educational cause affecting professional conduct or behavior, including religious or cultural beliefs (personal +behavioral).
  - Finding the solution - It is essential to determine the nature of a problem and an appropriate intervention. Some problems are beyond a resident's responsibility and should be channeled to the appropriate quarters, such as a counselor's office. Solutions for performance problems were categorized as:
    a. Educational strategies, e.g. educational intervention, skill training (1 & 2 above);
    b. Non-educational strategies, e.g. feedback, counseling (3 & 4 above).

5. Assessing Prior Knowledge

Intended Learning Outcome - The residents learn how to foster the acquisition of clinical skills and knowledge by activating existing knowledge

Teaching strategies:

- A 15-minute lecture explained the concept of prior knowledge, why it should be ascertained and how it influences feedback and stimulates learning.
- In a 45-minute discussion the residents generated methods for assessing students' prior knowledge, including formal enquiry, questioning of domain-related knowledge, and observation of students' performance.

Table 3. General evaluation of the 2-day workshop in answer to the question: How would you rate the workshop in the following specific areas, using the scale: 1 = totally disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = totally agree.

Aspect of the Workshop	N	Mean	Std. Dev.
Incorporate such a workshop in the specialist training program	10	4.80	0.42
The workshop was a good learning experience	10	4.50	0.53
I learnt new concepts that can improve my teaching	10	4.50	0.53
I feel better prepared in my role as tutor for medical undergraduates	10	4.30	0.48
Incorporate such a workshop in medical undergraduate program	10	4.20	0.79
Provided instruction is relevant for my clinical responsibilities	10	4.10	0.88
The workshop was well planned	10	4.10	1.10
The provided literature was appropriate	10	3.80	0.79
Length of individual sessions was appropriate	10	3.80	1.23
The duration of the workshop was appropriate	10	3.40	1.08
Valid N (listwise)	10		

6. Time Management

Intended Learning Outcome - The residents learn how to make use of their time efficiently. We defined effective time management as a function of an individual's perception of performance on a required task within a particular time frame. The emphasis in this module is to shift the current concept of time management as a function of duration (how much time is available) to that of efficiency (how much work is covered).

Teaching strategies:

- A 20-minute lecture on time management its influences on teaching. In a 30-minute session the residents outlined the negative effects of time shortage, such as work pressure and poor teaching. They generated suggestions for effective use of the time for teaching, which were compared with the following practical tips:
  - Define clear learning objectives and expectations at the outset.
  - Limit the number of learning objectives per encounter (2 seems ideal).
  - Establish a partnership with students, e.g. the teaching provided by residents in exchange for the students' assistance in carrying out routine clinical activities.
  - Share the responsibility for finding answers to difficult topics with students. Students can be of immense help in finding information faster for residents.
  - Delegate tasks and share patient responsibilities with students. Also give and request feedback. Students benefit from the experience, it motivates them and saves time that can be used for teaching.
  - Establish an honest and open atmosphere. This ensures students' understanding and consideration for the residents' limited time for teaching.

Evaluation of the Pilot Training Program

Procedure - After the workshop, the participants used a 10-item questionnaire (scale:1=totally disagree; 5=totally agree) to evaluate the workshop's effectiveness and the planning of the different sessions. A 17-item questionnaire (scale:1=very poor; 5=very good) was used to rate the quality of instruction in the following areas: Clarity and organization, Presentation style, Group interaction, and Content.

Results - Thirteen out of 15 (87%) eligible residents participated in the workshop. Twelve questionnaires were returned and two were left out the analysis due to missing data. Most of the residents had had no formal instruction in teaching before taking part in the workshop (n=7). There was agreement among the participants that such instruction would have been beneficial. The residents regarded the workshop as a good learning experience (4.50±0.53(mean±sd)) and agreed that such a workshop should be incorporated in their residency training (4.80±0.42). They considered the workshop well planned (4.10±1.10). Their opinion of the duration of the work-

Table 4. Mean ratings of the individual modules and quality of instruction in answer to the question: How would you rate the workshop sessions in the following specific areas, using the scale: 1 = very poor, 5 = very good

	Module 1	Module 2	Module 3	Module 4	Module 5	Module 6	
Aspect of Instruction	**Effective Teaching**	**Self Knowledge & Teaching Ability**	**Feedback Skills**	**Assessing Prior Knowledge**	**Trouble shooting**	**Time Management**	**Average of Means (instruction)**
Clarity & Organization	4.39	4.25	4.61	3.69	4.39	4.54	***4.31***
Presentation Style	4.36	4.26	4.42	4.38	4.36	4.33	***4.35***
Group Interaction	4.40	4.39	4.57	3.77	4.44	3.78	***4.23***
Content	4.30	4.24	4.24	3.78	4.37	4.04	***4.18***
Average of Means (modules)	***4.36***	***4.28***	***4.46***	***3.91***	***4.39***	***4.17***	

Overall evaluation of instruction: Mean= 4.27, SD=0.17, 95% CI of means= 4.15 – 4.39
Overall evaluation of the modules: Mean= 4.26, SD=0.20, 95% CI of means= 4.05 – 4.47

shop was almost neutral (3.40±1.08) (Table 3). The residents' perception of the quality of instruction was positive. Their responses showed that clarity and organization, presentation style, group interaction and content across the modules were rated highly (4.27±0.17) The overall ratings for the modules were also high (4.26±0.20) (Table 4).

Discussion

In this paper, a description of a workshop designed to improve the teaching skills of medical residents has been described. Assessments of the workshop's content and quality of instruction were also presented. The medical residents who participated in the workshop rated it positively, strongly recommending that such a workshop be incorporated in specialist training programs. The instruction provided in the workshop was considered good and relevant to the needs of medical residents and the ratings of the quality and content of the workshop were uniformly favorable. It was also considered to be an appropriate tool for training residents in teaching skills and equally feasible to implement. Based on the results of the evaluation in this pilot, we could not ascertain how effective the workshop was in improving teaching skills. Furthermore, the design of the evaluation was not suitable for this purpose as the number of participants was not large enough and the evaluations we collated were purely based on residents' self-perceptions.

A second study was therefore conducted to assess the effectiveness of the workshop on residents teaching abilities. A pre- and post-test, partially randomized, controlled study design was used for this purpose and medical students used standardized questionnaires to evaluate the teaching abilities of medical residents prior to, and after participating in the teacher-training workshop. The results showed that medical students perceived a significant difference in the teaching abilities of medical residents who participated in the teacher training workshop compared to those who did not.[24] The effect size within the intervention group was large compared to the control group, while a comparison between both groups showed a moderate effect size in favor of the intervention group. The observed improvements demonstrated that the intervention was effective in producing positive changes in medical residents' teaching skills.

The strength of this workshop is that the principles of learner centeredness were incorporated in the instruction methods used, and the workshop's design reflected evident consideration for the "wants" of the curriculum against the "educational needs" of the medical residents.[31] Also, the workshop was developed based on the recommendations of stakeholders following an initial needs assessment. In our view, the workshop described in this paper illuminates the important role of needs assessment in medical education and also illustrates a systematic approach for developing and evaluating educational interventions in post-graduate medical education.

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