Self-reported Competency Ratings of Graduates of a Problem-based Medical Curriculum

Henk G. Schmidt, PhD, and Henk T. van der Molen, PhD

**Abstract**

**Purpose.** To study the self-reports of professional competencies by graduates of a problem-based medical curriculum.

**Method.** All graduates from a medical school and a faculty of health sciences with a problem-based curriculum were sent a questionnaire asking them to compare their own performances in 19 domains with those of colleagues trained at schools with conventional curricula.

**Results.** Overall, alumni of the medical school rated themselves as better than colleagues who were trained at schools with conventional curricula for cooperation skills, problem-solving skills, skills relevant to running meetings, and the ability to work independently. There was no difference for possession of general academic knowledge and writing reports or articles. The self-reported ratings of better competencies were maintained after correcting the data for self-overestimation.

**Conclusion.** The problem-based medical curriculum appears to contribute to the development of professional competencies. Further study is needed, however, to control for the effect of selection bias and respondents’ emotional commitment to their alma mater.


The number of studies describing long-term effects of education on graduates of medical schools is fairly limited. This is particularly the case for studies of the effects of conventional education compared with innovative curricula employing such methods as problem-based learning, although studies involving students are more common.1,2 The reasons for the limited availability of data on graduates are threefold. First, comparing graduates from different schools on a number of relevant characteristics and then ascribing differences to the impact of the particular curricula studied is tricky business because the students may have been already different to begin with. Second, collecting reliable data is very difficult and expensive because graduates tend to change positions, often leaving no trace as to their whereabouts. And third, many relevant competencies, such as teamwork skills, are difficult to measure directly and require extended observation periods.

Consequently, our scant knowledge of how well graduates from problem-based medical schools are doing in professional practice can almost be summarized in one paragraph: Graduates from problem-based medical schools feel better prepared for professional practice than do their counterparts from conventional schools; they think that they are better able to communicate with their patients; and, while one study indicates they are better self-directed learners,3 other studies indicate they are not.6,7 Woodward and colleagues, at McMaster University, have demonstrated that supervisors characterize graduates from that problem-based school as better communicators with patients; another study showed that graduates from a problem-based curriculum in primary care practice spent more time on individual patients and referred them less often to specialized psychiatric services.9

The present study asked graduates from a problem-based medical school to compare their performances in professional practice with the performances of colleagues trained at schools with conventional curricula. To control for the possible effects of self-overestimation, the questionnaire included some competencies at which the graduates of the problem-based school were known to be no better than were graduates of conventional schools.
Table 1

Self-reports of Competency in 19 Skills by Graduates of a Problem-based Curriculum, University of Maastricht School of Medicine*

<table>
<thead>
<tr>
<th>Competency</th>
<th>School of Medicine</th>
<th>Faculty of Health Sciences†</th>
<th>Mean†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem-solving skills</td>
<td>3.8</td>
<td>3.7</td>
<td>3.7</td>
</tr>
<tr>
<td>Cooperation skills</td>
<td>3.9</td>
<td>3.8</td>
<td>3.8</td>
</tr>
<tr>
<td>Possession of profession-relevant knowledge</td>
<td>3.2</td>
<td>3.1</td>
<td>3.1</td>
</tr>
<tr>
<td>Possession of general academic knowledge</td>
<td>3.0</td>
<td>3.3</td>
<td>3.2</td>
</tr>
<tr>
<td>Interpersonal skills</td>
<td>4.2</td>
<td>3.9</td>
<td>4.0</td>
</tr>
<tr>
<td>Skills relevant to running meetings (e.g., chairing a meeting)</td>
<td>3.8</td>
<td>3.8</td>
<td>3.8</td>
</tr>
<tr>
<td>Writing reports or articles</td>
<td>3.0</td>
<td>3.5</td>
<td>3.3</td>
</tr>
<tr>
<td>Paper presentation skills</td>
<td>3.3</td>
<td>3.4</td>
<td>3.4</td>
</tr>
<tr>
<td>Research skills</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>Self-directed learning skills</td>
<td>3.6</td>
<td>3.5</td>
<td>3.6</td>
</tr>
<tr>
<td>Use of information resources</td>
<td>3.7</td>
<td>3.6</td>
<td>3.6</td>
</tr>
<tr>
<td>Professional skills (such as physical examination)</td>
<td>3.6</td>
<td>3.0</td>
<td>3.3</td>
</tr>
<tr>
<td>Producing new ideas to do one’s work in a better way</td>
<td>3.6</td>
<td>3.6</td>
<td>3.6</td>
</tr>
<tr>
<td>Helping colleagues</td>
<td>3.7</td>
<td>3.7</td>
<td>3.7</td>
</tr>
<tr>
<td>Productivity</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>Ability to work independently</td>
<td>3.8</td>
<td>3.9</td>
<td>3.9</td>
</tr>
<tr>
<td>Planning skills</td>
<td>3.6</td>
<td>3.7</td>
<td>3.7</td>
</tr>
<tr>
<td>Efficiency, time management</td>
<td>3.4</td>
<td>3.5</td>
<td>3.4</td>
</tr>
<tr>
<td>Ability to work under pressure</td>
<td>3.4</td>
<td>3.5</td>
<td>3.4</td>
</tr>
</tbody>
</table>

*In 1999, all graduates were asked to rate their competencies in comparison with the competencies of their colleagues from non-PBL schools using a five-point Likert-type scale (1 = less competent, 3 = equally competent, 5 = more competent).
†Reported only for comparison. No statistical test is reported.

In the spring of 1999, all alumni of Maastricht University School of Medicine were sent a questionnaire inquiring about their current perspective on the quality of their training. They were asked to rate themselves on 19 professionally relevant skills (see Table 1). Their task was to compare themselves with colleagues who had been trained elsewhere, and to indicate on a five-point scale whether they consider themselves less competent, equally competent, or more competent than these colleagues (3 = equally competent).

Participants were 820 graduates of the medical school of Maastricht University, 418 women and 402 men, who responded to the survey. These graduates represented 39% of the total population of physicians who had graduated from this school since its inception and who had entered practice up to 19 years previously. As a comparison group, responses from 1,448 graduates (1,109 women and 339 men) from the health sciences faculty of the same university were included. Both curricula employ problem-based learning as their instructional approach, emphasizing problem solving, small-group work, and self-directed learning. The health sciences data are reported in the results merely to put the medical school’s data into perspective.

Results

The responses by competency of medical school graduates (and faculty of health sciences graduates, for comparison only) are shown in Table 1. Medical school alumni rated themselves as better in the competencies of cooperation, problem solving, interpersonal skills, skills relevant to running meetings, and the ability to work independently. They did not rate themselves as better in the possession of general academic knowledge and writing reports or articles.

To control for the possibility that the medical school graduates may have overestimated their own competencies or underestimated those of others, we established a baseline by using the scores of competencies for which there is no reason to assume that graduates from Maastricht University School of Medicine perform better than graduates from elsewhere. For instance, previous research showed that Maastricht’s medical students have no more medical knowledge than do students from conventional schools. To be conservative, we established a baseline score of 3.3 to represent the value at which no difference in competence was observed.
discourages, problem solving, and
independent work reflect real differ-
ences rather than simple self-overesti-
mation effects. This may be particu-
larly true for their self-reports of competency
in interpersonal skills, which align with
findings from other studies in this
area.\textsuperscript{3,4,8}

\section*{Discussion}

The findings in our study may be good
news for those who believe that prob-
lem-based learning provides more than
simply a pleasant learning environment,
and that it contributes in significant
ways to the development of professional
competencies relevant to modern prac-
tice.

Despite our attempt to control for
systematic distortions of the graduates’
observations, however, there are at least
three alternative hypotheses that may
account for the data. The first is selec-
tion bias. The response rate to the sur-
vey was around 40\%. Although this re-
sponse is acceptable for a study
involving participants some of whom
had left their alma mater as long as 20
years ago, it is likely that those who re-
sponded were generally more successful,
which may have skewed the findings.
Studies involving comparisons between
volunteers and non-volunteers gener-
ally show these kinds of differences, but
they tend to be small. It is, therefore,
unlikely that this bias alone accounts
for the findings.

A second possibility is that the grad-
uates’ responses to the items were in-
direct expressions of gratitude to the
university: “You have been good to me.
Thank you!” If this were the case, it
would be a serious threat to the validity
of our findings, because it would imply
that the data do not reflect actual ob-
ervations but instead mirror a general
positive mood towards training. How-
ever, the data do not show an overall
positive trend that would suggest the
mood hypothesis to be likely. For ex-
ample, the graduates indicated that
their report-writing skills and their gen-
eral academic knowledge were not bet-
ter than those of colleagues trained else-
where. To evaluate the significance of
these two threats to the validity of our
findings, we are preparing a follow-up
study in which graduates from a univer-
sity characterized largely by conven-
tional teaching methods are asked to re-
spond to the same items.

A third possibility is that the prob-
lem-based curriculum involved may
have been so successful in transmitting
the theory and purported effects of
problem-based learning that graduates
—even after 20 years of professional ex-
perience—cannot see themselves as
anything but extremely adept problem
solvers, armed with great independent
working skills. This extremely unlikely
possibility has no apparent methodo-
logic cure. It would mean that, out in
the health professions, graduates oper-
ate with self-images so unfalteringly
positive that reality does not affect
them.

\section*{References}

1. Albanese MA, Mitchell S. Problem-based
learning: a review of literature on its out-
comes and implementation issues. Acad Med.
2. Schmidt HG, Dauphinée WD, Patel VL.
Comparing the effects of problem-based and
conventional curricula in an international
3. Mennin SP, Kalishman S, Friedman M, Pa-
thak D, Snyder J. A survey of graduates in
practice from the University of New Mexico’s
conventional and community-oriented, prob-
4. Santos Gomez L, Kalishman S, Rezler AG,
Skipper B, et al. Residency performance of
graduates from a problem-based and a con-
ventional curriculum. Med Educ. 1990;24:
366–75.
5. Shin JH, Haynes RB, Johnston ME. Effects of
problem-based, self-directed undergraduate
education on life-long learning. Can Med As-
soc J. 1993;148:969–76.
6. Tolnai S. Continuing medical education and
career choice among graduates of problem-
7. Tolnai S. Lifelong learning habits of physi-
cians trained at an innovative medical school
and a more traditional one. Acad Med. 1991;
8. Woodward CA, McAuley RG. Can the aca-
demic background of medical graduates be
detected during internship? Can Med Assoc
9. Woodward CA, Ferrier BM, Cohen M, Gold-
smith A. A comparison of the practice pat-
terns of general practitioners and family phy-
sicians graduating from McMaster and other
Ontario medical schools. Teach Learn Med.
10. Verwijnen GM, Van der Vleuten C, Imbos T.
A comparison of an innovative medical school
with traditional schools: an analysis in
the cognitive domain. In: Nooman Z,
Schmidt HG, Ezat E (eds). Innovation in
Medical Education, An Evaluation of Its
Present Status. New York: Springer Publish-
ing, 1990.