

Can a Family Medicine Curriculum Increase the Attraction of Family Medicine as a Career Choice?

Kann ein Allgemeinmedizincurriculum für eine Weiterbildung im Fach Allgemeinmedizin motivieren?

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Background

At Saarland University a competency-based blended learning curriculum was implemented in family medicine for year five medical students. Considering the shortage of future family physicians, this study investigates whether the curriculum increases the attraction of and assesses motivational drivers in family medicine as a postgraduate career choice.

Methods

During summer semester 2021, two online questionnaires were used to compare students' likelihood to engage in postgraduate training in family medicine, before and after curriculum participation. K-means Cluster analysis was performed to identify different motivational clusters of students, based on results from the Academic Motivation Scale. Motivational drivers were identified by descriptive quantitative analyses. JASP (Version 0.14.1) and Jamovi (Version 1.6) were used for data analyses.

Results

109 out of 111 enrolled students participated in the first questionnaire; 103 continued to participate in the second questionnaire. The likelihood to engage in family medicine specialty training increased significantly after participation in the curriculum ($p = 0.016$). Four constant motivational clusters were identified. Students perceived the focus on relevant primary care learning outcomes, the alignment of curriculum and exam content, the alignment of learning outcomes with state exam content, symptom-based learning, communication at eye level and the increased self-confidence in dealing with common disease patterns as particularly motivating.

Conclusions

A compulsory family medicine curriculum in medical school may influence a students' choice to specialize in this field. The identified motivational drivers seem to be useful for future curriculum redesign projects in family medicine.

Keywords

family medicine; undergraduate medical education; motivation; cluster analysis

Hintergrund

An der Universität des Saarlandes wurde ein neu strukturierter, kompetenzbasierter Blended-learning-Pflichtkurs Allgemeinmedizin im 5. Studienjahr implementiert. In Anbetracht des drohenden Hausarztmangels untersucht diese Studie, ob ein universitärer Kurs die Studierenden in dem Wunsch, eine Weiterbildung im Fach Allgemeinmedizin zu wählen, beeinflussen kann. Es wird untersucht, welche Aspekte des Allgemeinmedizinkurses besonders motivierend sind.

Methoden

Zwei Online-Fragebögen wurden verwendet, um die Motivation für eine Weiterbildung im Fach Allgemeinmedizin vor und nach Belegen des Kurses im Sommersemester 2021 zu vergleichen. Basierend auf den Ergebnissen der *Academic Motivation Scale* wurde mittels Clusteranalyse das Motivationslernverhalten von Studierenden im Kurs analysiert. Motivierende Aspekte des Kurses wurden deskriptiv anhand quantitativer Daten identifiziert. Für die Datenanalyse wurden die Statistikprogramme JASP (Version 0.14.1) und Jamovi (Version 1.6) benutzt.

Ergebnisse

109 von 111 im Kurs eingeschriebenen Studierenden nahmen am ersten Fragebogen, 103 am zweiten Fragebogen teil. Studierende konnten sich nach Belegen des Kurses signifikant besser vorstellen, eine Weiterbildung im Fach Allgemeinmedizin zu wählen ($p = 0,016$). Vier sich in ihrer Motivation unterscheidende Cluster an Studierenden konnten identifiziert werden. Studierende empfanden die Eingrenzung auf relevante Themen, das *Alignment* zwischen Kurs- und Klausurinhalten, die Abstimmung der Inhalte mit mit staatsexamensrelevanten Inhalten, die symptomorientierte Lehre, die Kommunikation auf Augenhöhe und das Gefühl, mit alltäglichen Krankheiten souveräner umgehen zu können, als besonders motivierend.

Schlussfolgerungen

Ein Pflichtkurs Allgemeinmedizin kann die Wahl einer späteren Spezialisierung in der Allgemeinmedizin möglicherweise beeinflussen. Die identifizierten motivierenden Aspekte können für zukünftige Kursentwicklungen in der Allgemeinmedizin hilfreich sein.

Schlüsselwörter

Allgemeinmedizin; Medizinstudium; Motivation; Clusteranalyse

Introduction

Currently, a generational change in family medicine (FM) is taking place in Germany. Many family doctors retire or will retire in the near future [1]. At the same time, experts predict a shortage of family medicine trainees to meet future demand for FM specialists in Germany [2]. One strategy to address this problem is to increase the amount of medical students specializing in FM as a postgraduate career choice [3]. The World Organization of Family Doctors (WONCA) states 'that medical schools can play a big role in influencing students' interest in FM, and they need to adjust their curricula accordingly' [4]. International FM education research found that early FM placements in medical school are associated with a greater likelihood of specializing in FM [3, 5]. Research in Germany has shown that interventions later on in medical school, like the compulsory internships and high-quality training during clinical electives in FM may also motivate students to specialize in FM [6, 7].

To date, the effects on motivation of a compulsory FM curriculum during advanced medical school training have not yet been investigated in Germany.

At Saarland University (UdS) a competency-based blended learning FM curriculum was implemented for year five medical students in winter semester 2020/21. It replaced a primarily lecture-based curriculum. The FM learning activities take place weekly over one semester. Based on the National Competency-Based Learning Outcome Catalogue for Medicine (NKLM), the curriculum's overarching learning objective is to develop procedural skills to manage a patient in a FM practice. Online learning activities (podcasts, AMBOSS® articles, formative AMBOSS® assessments, symptom-based lectures) are combined with three in-class simulations in which students actively practice FM patient management. Each seminar focuses on typical FM associated symptoms: abdominal pain, febrile infection and back pain. A tablet-based multiple-choice exam concludes the curriculum. Exam questions derive from the German National Institute for state examinati-

ons in Medicine (IMPP) question pool and they are aligned with the curriculum's learning objectives.

Self-determination Theory serves as the constructivist theoretic foundation for the curriculum design. Based on Self-determination Theory, there are three types of motivation: autonomous motivation, controlled motivation and amotivation [8]. In an educational setting, amotivation describes the lack of motivation to learn [9, 10]. Controlled motivation refers to students learning out of obligation, grades or for external rewards, while autonomous motivation refers to students learning out of a genuine interest to learn or to experience improvement [8, 11, 12]. Autonomous motivation is associated with numerous positive behavioral outcomes like enhanced academic performance and life-long learning [12, 13]. Kusrkar et al. (2011) found that motivation also influences students' choice of specialty training [13].

To date, it is unknown what role motivation plays during a compulsory FM curriculum in undergraduate medical education in Germany.

First, this study aims to identify students' interest in a future FM career and whether the FM curriculum increases the attraction of FM as a career choice. Secondly, this study investigates students' motivation within the curriculum. It tries to find motivational clusters within the stu-

dent population and intends to find out what aspects of the curriculum motivate students most to study for FM during medical school.

Methods

Participants and setting

The study was conducted at the Faculty of Medicine at UdS. Study participants were medical students who participated in the compulsory FM curriculum at UdS during summer semester 2021. Students who participated in winter semester 2020/21 were used to compare cluster building. The online questionnaires were connected to curriculum and exam registration. Participation was fully voluntary and registration and exam were still possible without study participation. Students had to consent to participation and anonymized data collection and storage electronically. Students' last returned online questionnaire version was counted. If items of a category within the Academic Motivation Scale (AMS) were not fully answered, participants were excluded from this category. Ethics approval was obtained by Saarland medical association ethics committee on 25.09.2020 (Bu 234/20).

Study design and data collection

This explorative, quantitative study used two questionnaires (Q1, Q2). Af-

	scale	m ± SD
Q1		
1. To what extent can you imagine specializing as a family physician?	0–10	4.85 ± 3.05
2. I am aware of typical family physicians' daily chores.	1–7	5.92 ± 0.79
Q2		
1. To what extent can you imagine specializing as a family physician?	0–10	5.32 ± 2.95
2. I am aware of typical family physicians' daily chores.	1–7	5.90 ± 0.79
3. After the curriculum, I have a better grasp of future interdisciplinary collaborations with family physicians (for example as an inpatient resident).	1–7	5.68 ± 1.02
4. My collegial appreciation for family physicians has increased due to my experiences in the curriculum.	1–7	5.34 ± 1.22

Likert Scale 0–10: 0 = not at all likely – 10 = very likely; Likert Scale 1–7: 1 = does not correspond at all, 7 = corresponds exactly

Table 1 Questions before (Q1) and after (Q2) students participated in the family medicine curriculum at Saarland University.

ter Q1-Q2 alignment based on students' e-mail address, data was anonymized and stored on the university server for 10 years.

Q1 was conducted at the beginning of the semester. For this study, four closed-ended questions were considered. Students' gender, their intended specialty training and information about students' interest and experience in FM before they participated in the FM curriculum at UdS were asked (table 1).

Q2 consisted of 56 closed-ended questions and was conducted at the end of the semester. Q2 consisted of three blocks:

The first block contained a translated version of the AMS [9]. The AMS is a 28-item tool to measure motivation. The questions were adapted to the setting (FM curriculum at UdS).

The second block focused on the different educational components of the curriculum and to what extent they motivate students to study for FM. 22 self-designed items to quantify the impact of a variety of factors on motivation were introduced. Items were grouped into three categories: curriculum design, role of the teacher and personal enrichment, based on the qualitative findings from Bopp et al. [14] (table 2).

The third block focused on students' interest in FM specialization after they participated in the FM curriculum (table 1).

Questions featured a seven-point Likert scale (1 = does not correspond at all, 7 = corresponds exactly). Students' self-reported likelihood of a FM specialization before and after the curriculum was rated on a scale from 0 (not at all likely) to 10 (very likely).

Data analysis

JASP (Version 0.14.1) and Jamovi (Version 1.6) were used for data analyses. Shapiro-Wilk test was used to test for normality of continuous variables. Before and after curriculum participation comparisons were performed using Wilcoxon-Rank test. AMS results were analyzed by category: 1) autonomous motivation 2) controlled motivation and 3) amotivation, as done by Salzmann et al. (2022) [15]. Cronbach's α was used to analyze internal consistency of AMS results. Based on AMS results, K-means cluster analysis were

I was motivated to study for family medicine by ...	m \pm SD
1. Curriculum design	
1) Homepage set up	5.38 \pm 1.37
2) Interactive learning activities	5.67 \pm 1.32
3) Instructional videos	5.26 \pm 1.30
4) Expert commentaries on AMBOSS® chapters	5.33 \pm 1.27
5) Formative multiple-choice AMBOSS® assessments	5.59 \pm 1.40
6) Podcasts as learning activity	5.46 \pm 1.70
7) Symptom-based kick-off lectures	5.50 \pm 1.42
8) Content alignment with AMBOSS®	5.83 \pm 1.30
9) Additional voluntary workshops	5.45 \pm 1.69
10) Primary care patient simulations	5.77 \pm 1.38
11) Standardized module structure	5.63 \pm 1.33
12) Symptom-based learning	6.26 \pm 0.96*
13) Reduction to relevant primary care learning outcomes	6.17 \pm 1.07*
14) Sensation of assessment due to simulation-based learning	5.76 \pm 1.45
15) Clear communication of exam content	6.30 \pm 1.11*
16) Alignment of learning outcomes with IMPP relevant content	6.31 \pm 1.20*
2. Role of the teacher	
1) Contact with staff	5.67 \pm 1.21
2) Use of personal experiences/ anecdotes	5.91 \pm 1.10
3) Communication at eye level	6.15 \pm 1.11*
4) Role model character concerning professional and personal development	5.45 \pm 1.42
3. Personal enrichment	
1) Increased self-confidence in dealing with common disease patterns	6.02 \pm 1.12*
2) Increased knowledge of Family Medicine practices (for example prescription, referral)	5.83 \pm 1.17

Likert Scale 1–7, 1 = does not correspond at all, 7 = corresponds exactly. *Marked are mean scores above 6.

Table 2 Motivational drivers of the curriculum to study for family medicine

performed and compared to another semester group (winter semester 2020/21). Mann-Whitney U-Test was used to correlate gender and autonomous motivation. Kruskal-Wallis test with subsequent DSCF pairwise comparisons was used to correlate intended specialty training and autonomous motivation. Other than that, results were analyzed descriptively including mean and standard deviation (m \pm SD).

Results

Study cohort

Out of N = 111 students enrolled to read FM, N = 109 students participated in Q1 (98 % response rate) and N = 103 students participated in Q2 (93 % response rate). Cronbach's α

was 0.951 for autonomous motivation, 0.843 for controlled motivation and 0.893 for amotivation. The mean age of the participants was 24.2 years \pm 2.35 years. 58 % of the participants were female and 42 % were male.

Students' interest in post-graduate specialization in FM

8 % of the participants name FM as their first choice of specialization. 22 % are still unsure about future specialization, 5 % waver between FM and something else and 65 % opt for a specialization outside of FM. Students reach significantly higher scores when asked about the extent to which they can imagine specializing in FM after their participation in the curriculum (W = 845; p = 0.016). No significant dif-

ference can be found regarding students' awareness of typical family physicians' daily chores before and after curriculum participation ($W = 410$; $p = 0.776$). 86 % of the participants state that after curriculum participation, they have a better or slightly better grasp of future interdisciplinary collaborations with family physicians (for example as an inpatient resident). 68 % of the students mention that their collegial appreciation for family physicians has increased or partly increased due to their experiences in the FM curriculum.

Students' motivation to study within the family medicine curriculum

Students' motivational set up can be clustered into four groups. These clusters are comparable between winter semester 2020/21 and summer semester 2021. Based on the results from summer semester 2021 (figure 1), most students are either in cluster 1 (34.0 %) or cluster 4 (34.0 %). Cluster 1 students cannot clearly be attributed to only one type of motivation. They appear to show a small tendency to being autonomously motivated, since controlled motivation and amotivation is low. Cluster 4 students are autonomously as well as controlled motivated. Cluster 2 students (20 %) are primarily amotivated but show some controlled motivation. Cluster 3 students (12 %) are different to cluster 2 students. They are primarily amotivated, without tendencies of controlled or autonomous motivation.

Within the curriculum, three main sociodemographic characteristics of students were identified:

1. Female participants reach significantly higher scores of autonomous motivation than male students ($U = 886$, $p = 0.010$).
2. Participants that want to specialize in FM reach significantly higher scores of autonomous motivation compared to students that are unsure about their future intended specialty training or students that opt for a specialization outside of FM ($W = 4.569$; $p = 0.007$, $W = 4.513$; $p = 0.008$).
3. Cluster 3 is the only cluster of students that do not increase but decrease their likelihood to consider FM as specialization choice after participating in the curriculum (before: 3.45 ± 3.39 vs. after: 2.82 ± 3.25).

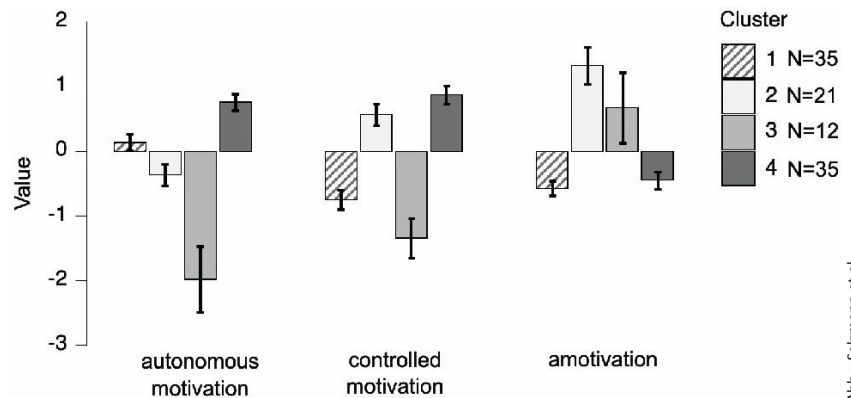


Figure 1 Clusters of students according to their motivational set up within the family medicine curriculum in summer semester 2021. A value above 0 refers to the expression of that type of motivation. A value below 0 refers to the absence of that type of motivation. The expressivity of the trait is marked by the height of the bars.

Motivational drivers during the semester

Table 2 shows to what extent aspects of the FM curriculum motivate students to study for FM. Very important drivers reach a score above six out of seven. These are: symptom-based learning, reduction to relevant primary care learning outcomes, clear communication of exam content, alignment of learning outcomes with IMPP relevant content, communication at eye level and an increased self-confidence in dealing with common disease patterns. Cluster 3 students reach overall lower scores. They reach their highest scores in symptom-based learning (5.33 ± 1.61), alignment of learning outcomes with IMPP relevant content (5.25 ± 1.82) and reduction to relevant primary care learning outcomes (5.25 ± 1.71).



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Discussion

A compulsory FM curriculum in advanced medical school training may influence a students' choice to specialize in FM. According to cluster analysis, the likelihood to engage in FM specialty training increased in most students. Six important motivational drivers in the FM curriculum were identified.

Implications for future family medicine education

International research has shown that especially early and longer interventions in medical school lead to higher rates of postgraduate FM specialization [3, 16]. Most students decide about their residency choice during the third and fourth year of medical school [16]. This study indicates that even shortly before clinical electives, 27 % of the participants are still not firm about their choice of specialty. Later interventions (internship, clinical elective, and now also: curriculum) might be effective in stabilizing students' wish to specialize in FM and convincing students that are still unsure about specialization [6, 7]. Additionally, the curriculum addresses the role of FM within the health care system in Germany. Participants show a better understanding of good interdisciplinary collaboration and increased collegial appreciation for family physicians after exposure to the UdS FM curriculum. To combine early and late curriculum effects, FM education needs to strive for a longitudinal curriculum from year one all the way to year five [16]. The Masterplan Medi-

Abbreviations

AMS	Academic Motivation Scale
FM	Family medicine
IMPP	German National Institute for state examinations in Medicine (Institut für medizinische und pharmazeutische Prüfungsfragen)
m	Mean
N	Number
NKLM	National Competency-Based Learning Outcome Catalogue for Medicine
Q1	Questionnaire 1
Q2	Questionnaire 2
SD	Standard deviation
UdS	Saarland University (Universität des Saarlandes)
WONCA	World Organization of Family Doctors

zinstudium 2020 takes up this idea and demands a competency-based longitudinal curriculum in FM in Germany [17]. The transitioning phase to a competency-based longitudinal curriculum will take time to set up for FM departments in Germany. At UdS, this study was part of a first step towards this change. Results reveal that there are six important drivers that may stimulate students' autonomous and controlled motivation in a FM curriculum. Besides of an increased perceived self-confidence in dealing with common disease patterns, these drivers do not seem to be specific for FM education.

Further need for research

WONCA states that 'the wide diversity of FM curricula and teaching methodologies can be an opportunity to compare what works best and what does not' [4]. More research is needed concerning the short- and long-term effects of interventions in FM education in Germany. Cluster building showed that a small number of students within the curriculum could not be motivated sufficiently. Future qualitative studies on this cohort may help to find specific motivational drivers and design a more inclusive curriculum.

Strengths and limitations

The study was conducted during SARS-CoV-2 restrictions. This might especially be relevant when looking at

students' motivation and cluster distribution. This study has no follow-up to determine long-term effects concerning students' career choice. At UdS the FM internship is part of another semester and may therefore be excluded as a potentially confounding factor.

Conclusions

A one semester competency-based FM curriculum in year five can encourage students' interest to specialize in FM. The identified motivational drivers seem to be useful to have on hand during the national challenge of creating a longitudinal competency-based FM curriculum.

Competing interests:

The authors declare that they received financial and structural support by AMBOSS®, the Medical Faculty of Saarland University and the Kassenärztliche Vereinigung Saarland. The department for family medicine Homburg has cooperation agreements with AMBOSS® and the IMPP as external parties. No external party had any influence on study design, data collection, analysis, or publication procedures.

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