

THE INFLUENCE OF WORKPLACE LEARNING ON THE DEVELOPMENT OF MEDICAL STUDENTS' PROFESSIONAL IDENTITY

Ph.D. Thesis Booklet

Szabolcs Fábry

Semmelweis University Doctoral College

Theoretical and Translational Medicine Division



Supervisor:

Ajándék Eőry M.D., Ph.D.

Official reviewers:

Levente Kiss M.D., Ph.D.

Anna Nánási M.D., Ph.D.

Head of the Complex Examination Committee:

András Szabó M.D., D.Sc.

Members of the Complex Examination Committee:

Miklós Tóth M.D., D.Sc.

Gergely Zachar Ph.D.

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1. Introduction

Medical training is situated between learning and work and is closely connected to experience. Experience supports the development of the professional identity during the progression from entering medical school to becoming a qualified doctor. In this process, learning is situated in the learning environment. The learning environment is not only the place of learning, but the atmosphere of the workplace. Preceptors have an active role in this learning activity, connecting students with other components of the learning environment. A special option to connect experience and learning is early clinical experience (ECE). Based on the special context of workplace learning, participants' responses serve as a valid source of information for assessing the authentic world of medical education. As students learn medicine in these workplaces, instruments were developed to assess the influence of the learning environments. The Manchester Clinical Placement Index (MCPI) is a validated questionnaire for evaluating the learning environment in authentic settings.

2. Objectives

The MCPI was developed, validated and used in English-speaking cultures. The possibility to assess the quality of the learning environment using an approved instrument is a prerequisite for the internationalization of medical education, which supports the development of common standards and the investigation of cultural similarities and differences.

1. Our aim was therefore to explore the psychometric properties (factor structure and reliability) of the MCPI in a Hungarian medical school. Capitalizing on the qualitative and quantitative design of the instrument, we chose a mixed-methods study design.

On the other hand, although a considerable amount of data is available on ECE programs in Europe and the UK, qualitative evaluation of these programs is limited.

2. Therefore, in the next study, we aimed to explore the characteristics of clinical experience in the preclinical years by analysing the free-text responses of the MCPI, revealing the key components that facilitate the acquisition of clinical experience in the early phase of medical

training and provide an environment in which medical students can safely develop their professional identity.

3. Methods

Two single-center, observational studies were conducted at Semmelweis University in Budapest between the academic years 2019 and 2024. The University's Regional Research Ethics Committee approved the studies with ethical approval number 243/2019. All enrolled students were invited to fill out the questionnaire. Participation in both studies was anonymous and voluntary. In both studies, the MCPI was used, a self-report instrument to measure the quality of support for students' real patient learning in communities of practices. The instrument reveals eight items with two factors: five items evaluate the learning environment (leadership, reception, people, facilities and organisation) and the remaining three assess the quality of training (instruction, observation and feedback). Each item of the questionnaire starts with a definition followed by a numerical rating on a seven-point Likert scale. In addition, students can add free-text comments on the strengths of the workplace learning and

how teaching could be improved in relation to the item. Answering the quantitative items of the MCPI was mandatory, while the free-text items were optional.

The first study, the validation procedure was a cross-sectional study in 2019 and 2021, focusing on real patient learning across the entire medical training program. Students participating in hospital settings (Intensive Therapy and Anaesthesiology rotation), primary care settings (Family Medicine rotation) and early clinical experience (Introduction to Clinical Medicine placement) were invited to complete the online or paper written form of the MCPI. For the analysis of the properties of the MCPI, descriptive statistics were first calculated. To determine the internal structure of the scale, we first explored the factor structure and factor loadings of each item using exploratory factor analysis (EFA), then subjected the entire dataset to confirmatory factor analysis (CFA). The preliminary assessment showed high correlations between items of the instrument. Therefore, we focused on explaining the relationship between the items by further qualitative analysis. This qualitative

approach helped to explore how participants' responses contributed to this phenomenon through the wording of the instrument.

The second study was a cross-sectional analysis that evaluated the characteristics of early clinical experience using data collected in 2019 and between 2021-2024. The 'Introduction to Clinical Medicine' placement was a small-group course in which first-year medical students took the medical histories of patients selected by an experienced family medicine preceptor in the surgery on a weekly basis for one semester. The study focused on the characteristics of preclinical students' learning from real patients in clinical settings and the influence of the experience on their learning. Students' free-text responses to the MCPI provided textual material that was subjected to latent construct analysis.

4. Results

We approached the Hungarian use of the MCPI from two different angles: one focused on the validity and reliability of the instrument in a cultural context different from the original English setting. The other aim was to explore

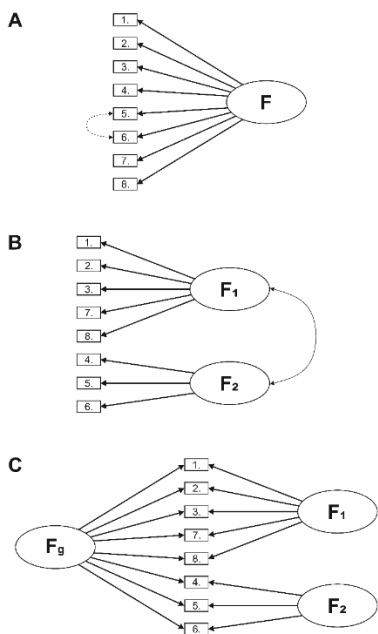
constituents that made the learning process of early clinical experience safe and effective.

4.1. Validation procedure for the assessment of the Hungarian version of the MCPI

The descriptive statistics of the validation procedure showed that all items had positive asymmetry and a platykurtic distribution. Therefore, the polychoric correlation and weighted least square mean and variance adjusted (WLSMV) parameter estimator were considered suitable for performing factor analysis. The correlation matrix of all items showed that most of the items were highly correlated. The correlation between items 5 (observation) and 6 (feedback) was nearly 0.80, indicating multicollinearity. In order to clarify the statistical observation of multicollinearity between ‘observation’ and ‘feedback,’ we examined participants’ free-text responses about the strengths and weaknesses of the two variables. In the responses, the components of learning, namely observation, feedback, were often presented as interchangeable categories. This was probably due to the dynamics of clinical work, where continuous observation

also acted as a form of feedback, and where close observation was required for meaningful feedback.

We performed a confirmatory factor analysis (CFA) with different models: (A) unidimensional, (B) two dimensions with correlation, and (C) bifactor model (Figure 1).



1. Figure. Different factor models of the MCPI. (A) Unidimensional; (B) Two dimensions with correlation; (C) Bifactor model. F_g = General Factor, F_1 = Learning environment, F_2 = Training.

The modified unidimensional model with the addition of the error covariance between items 5 and 6 illustrated an

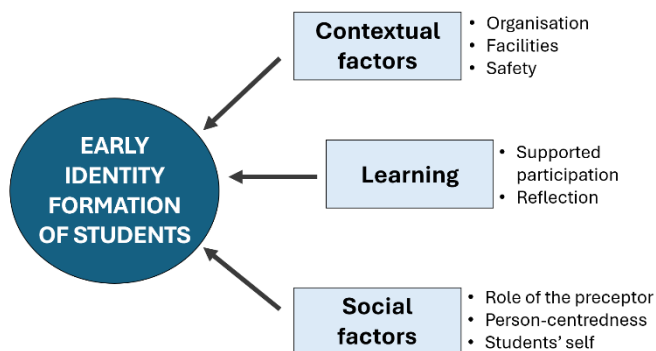
appropriate model fit. Two dimensions with correlation showed acceptable fit, but slightly lower than the modified unidimensional model. The bifactor model provided an excellent fit to the correlation matrix.

The pattern of the results suggested a unidimensional model, with all items loading strongly on a single factor. Explained common variance (ECV) for the general factor was 0.82, indicating that the general factor explained a high percent of the common variance. In contrast, the ECV for the two specific factors (0.04 and 0.14) was low, indicating that these factors explained a lower proportion of the items' common variance. The high value of ω_H for the general factor (0.87) proved that the total scores can be considered unidimensional. The low ω_H values for the specific factors (0.01 and 0.28) tended to confirm the unidimensional factor structure. Overall, the high general ECV values and the high value of ω_H , supported unidimensionality.

4.2. Qualitative analysis of the early clinical experience

The qualitative analysis of the ECE context revealed three main themes: the role of context in early clinical

experience, the specificities of learning in clinical setting, and role conflicts during learning (Figure 2).



2. Figure. The constituents of students' early identity formation.

The clinical environment was unfamiliar to the novice medical students, so the warm, welcoming reception they experienced from the preceptor was particularly important in helping them feel safe and able to complete the task assigned to them. Likewise, the surgery, as a site for clinical work, presented an inspirational learning environment and the structure conveyed a sense of predictability, so the focus was entirely on students.

The preceptor had a central role in the placements, connected the students with the clinical environment. A

collegial and calm atmosphere created a safe space where students ventured to step out of their comfort zone and practice with the patient in the presence of the group and the preceptor. Students were active participants and the preceptor facilitated the development of new abilities appropriate to their future medical roles. Meaningful learning required specific steps in this context.

Early clinical experience revealed a tension between the professional and lay role, as well as between the actual and desired role, in the triad of preceptor – student – patient. Maintaining a humane approach required continuous support from the preceptor, who enriched pure theoretical knowledge with the humane aspects gained from clinical experience and interactions, similarly to the essential abilities required for professional identity formation.

5. Conclusions

In our first study, we concluded that the factorial structure of the Hungarian version of the MCPI was best explained as a unidimensional instrument. The statistical analysis identified a strong general factor, which supported the use of the total score, while the distinct application of the

subscales was not statistically supported due to their low reliability. This observation can be explained by socio-cultural differences between the original and present context. The applicability of the MCPI, based on its dual structure and the option of additional textual answers, allows this instrument to be used for the development of curriculum as well. The responses provide valuable insight into the factors that medical students highlight regarding their workplace learning; this enables direct feedback to preceptors and the faculty, which can contribute to the development of best practices in medical education.

The MCPI proved to be suitable for assessing the constituents of workplace learning in early clinical experience. The qualitative analysis of early clinical experience revealed three central themes: the influence of contextual factors in facilitating active student involvement; observation and personalised feedback as central elements of learning; and sources of tension for both students and preceptors. The factors listed above supported the formation of knowledge in an authentic clinical context, while the preceptors' professional

empathy set an example to follow, thereby supporting a humane, person-centred approach to care and the development of professional identity. Overall, our findings emphasise the importance of the welcoming atmosphere and preceptorial support in this setting.

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