

Peer-reviewed academic journal

Innovative Issues and Approaches in Social Sciences

IIASS – VOL. 14 (2021)

Innovative Issues and Approaches in Social Sciences

IIASS is a double blind peer review academic journal published 3 times yearly (January, May, September) covering different social sciences: political science, sociology, economy, public administration, law, management, communication science, psychology and education.

IIASS has started as a SIdip – Slovenian Association for Innovative Political Science journal and is being published by ERUDIO Center for Higher Education.

Typeset

This journal was typeset in 11 pt. Arial, Italic, Bold, and Bold Italic; the headlines were typeset in 14 pt. Arial, Bold

Abstracting and Indexing services

COBISS, International Political Science Abstracts, CSA Worldwide Political Science Abstracts, CSA Sociological Abstracts, PAIS International, DOAJ, Google scholar.

Publication Data:

ERUDIO Education Center

Innovative issues and approaches in social sciences, 2021,
vol. 14

ISSN 1855-0541

Additional information: www.iiass.com

HOW DO GRADUATING PHYSIOTHERAPY STUDENTS PERCEIVE THEIR PROFESSIONAL COMPETENCE?

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Abstract

In 2010, competence-based education was introduced in the physiotherapy education programme at the University of Ljubljana, Faculty of Health Sciences. Competencies are described as the set of knowledge, skills and attitudes required for professional functioning. The purpose of the study was to determine students' perceptions of their competencies acquired at the university and in the clinical setting after a three-year physiotherapy course. The students who participated in this study were enrolled in the undergraduate physiotherapy course offered by the Faculty of Health Sciences at the University of Ljubljana. Fifty-three subjects, 8 males and 45 females, with an average age of 23.8 years (range 22 to 29 years) completed the questionnaire. Physiotherapy competency scale format was used to develop questionnaire for this study. Means and standard deviations were calculated for the overall perception of the students' competencies. Kendall's tau-b and Pearson correlations were calculated ($P < .01$) for the relationship between students' demographic characteristics and perceptions of their competence. Students' perceptions of their overall competencies averaged 3.58 (.68). The mean of the competencies acquired at the university and in the clinical setting were 3.41 (.74) and 3.74 (.68), respectively. Perceived competence appeared to increase in the clinical setting. This result was expected because students gain a more accurate picture of the complexity of the workplace and can more accurately compare their own competence to the demands of the workplace. To get a more accurate picture of the developmental process of individual students after a three-year course, a longitudinal study would be needed.

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Key words: skill, competence, higher education, self-rated competences

Introduction

A competence-based approach has emerged in higher education discussions and research around the world in recent decades. In this context, the Bologna Process (Bologna Declaration 1999) is an important reform initiative aimed at structuring higher education, ensuring its quality, and increasing employability through lifelong learning and wider access to higher education. Competence-based education focuses not only on isolated knowledge and skills, but on the development of competence, the integrated use of knowledge, skills, and attitudes to carry out professional tasks (Visser et al., 2014).

Researchers provide different definitions of competence. In the literature, it is typical to view competence as a holistic concept that integrates factors of knowledge, skills, and attitudes while recognizing the situated and contextual nature of competence (Mulder et al., 2009). Professional competence refers to a generic, integrated, and internalised capability that enables an effective performance in certain task situations, in a real performance context in the professional domain (Mulder, 2014). The development of professional competence is a long process that always requires learning the intentional pursuit as well toward the improvement of performance. This enables an individual to work effectively in different and changing situations, and to learn and develop his or her own competence (Mulder et al., 2009; Kurunsaari et al., 2015). A review of the use of the concept of competence in higher education in some European Union countries was carried out and it was found that competence can be described in terms of six characteristics (1) integration between knowledge, skills and attitudes, (2) interdependence between different competences, (3) the need for performance or problem-solving situations to develop and assess competence, (4) specificity of different competences, (5) the fact that competence is developed by learning and doing and cannot be 'transferred' from teacher to student, and (6) permanency, meaning that competence has a certain stability over time (van Merriënboer et al., 2002). Altogether, two aspects seem to be generally included in the definitions of competence: the integration of knowledge, skills

and attitudes, and a reference to a certain occupational context (Baartman and Rujis, 2011).

To ensure compatible and comparable qualifications among graduates within the European Union, the European Commission has launched the European Qualifications Framework (EQF), specifying skills, knowledge, and competences at different educational levels (EQF, 2017). In Slovenia, all institutes providing higher vocational education are currently implementing competence-based education based on core vocational competences and competence-based qualification profiles (The Slovenian Qualifications Framework, SOK, 2020). All institutes offering higher vocational education have described the competences students need to develop for qualification. In an accreditation procedure individual higher education institutes must demonstrate that their programme meets the national competence profile. To demonstrate their educational programme meets the requirements of the general bachelor level, institutes relate their programmes to the European Dublin descriptors (EQF, 2017). The Dublin descriptors offer generic statements of typical expectations of achievements and abilities associated with qualifications that represent the end of each of the Bologna cycle and refer to the following five dimensions: 'knowledge and understanding', 'applying knowledge and understanding', 'making judgements', 'communication' and 'lifelong learning skills'. In 2010, competence-based education was introduced in the physiotherapy educational program at the Faculty of Health Sciences University of Ljubljana (FHSUL) in Slovenia. When the European Qualifications Framework was published, the education in the bachelor program of physiotherapy in Slovenia was defined along the educational level 6 of the EQF6 requirements, which is considered as the level of minimum competences a physiotherapist needs to practice independently and autonomously, as defined in the European Skills, Competencies and Occupations framework (ESCO, 2017).

Physiotherapy is an internationally recognised health profession and may only be practised by qualified physiotherapists who have professional autonomy. In other words, qualified physiotherapists have the freedom to exercise professional judgement in health promotion, in injury prevention and in the care and treatment of clients and patients within the limits of the therapist's prevailing knowledge and competence (World Confederation for Physical Therapy – WCPT, 2018). The promotion of wellness requires

physiotherapists to rehabilitate, treat, counsel and support populations' health, that is, their physical and social well-being and functioning, by using various guidance and teaching methods as well as physiotherapeutic treatments (WCPT 2018; ENPHE 2017). In the field of physiotherapy, the primary focus of the profession is human movement and function. Therefore, professional competence relates to practitioners examining and assessing patients, providing advice and guidance, performing manual therapies and therapeutic exercises, and assisting clients to achieve optimal range of motion and function and promote health and well-being using evidence-based knowledge. Good communication skills and cultural competence, as well as the ability to consult other professionals, are also considered important in physiotherapy.

Much attention has begun to be paid to the competency perspective, that is, how physiotherapy students acquire generic and professional skills and competencies for qualification in the field of physiotherapy education and practice. Professional skills and competencies of physiotherapy have been defined in several studies. Researchers have examined physiotherapy students' perceptions of their professional skills and competencies, such as specific manual skills (Lo et al., 2015; Rossettini et al., 2017), disease-specific knowledge (Briggs et al., 2012), students' reflective and critical thinking skills in practice (Baradell et al., 2018), clinical decision making to assess high quality clinical research on treatment efficacy (Yamato et al., 2017), interprofessional skills (Hallin et al., 2009), digital competence and social competence (Grace and Trede 2013), and cultural competence (Wickford, 2014). However, less is known about how physiotherapy students perceive their professional development during their time at university and in clinical settings. This type of knowledge is important for the development of physiotherapy education as it can highlight the critical aspects of education that should be given special attention. Physiotherapy students' awareness of their own thinking and behaviour can positively influence students' future professional development and the future level of competence of the physiotherapy profession (Wikström-Grotell and Eriksson, 2012).

This article focuses the perceived competence development of students in higher vocational education. The aim of the study was to investigate physiotherapy students' perceptions of their own professional competence at the end of their studies in two settings,

university, and clinic. The following research question was addressed: How do physiotherapy graduates perceive their professional competence?

Methods

Participants

A descriptive cross-sectional study was conducted among the cohort (2015-2016) of graduates of the bachelor's programme at the Faculty of Health Sciences University of Ljubljana (FHSUL) in Slovenia. FHSUL offers a 3-year bachelor's degree programme in Physiotherapy (180 European Credit Transfer and accumulation system - ECTS credits), which consists of theoretical studies (46%) and practical training at the university and in clinical institutions (54%). One ECTS credit relates to 30 hours of student workload, so a student's total workload over the three years of study is 5400 hours. Students are required to complete a 20-week clinical setting across the curricula (from February to March and from June to July or August in the 2nd and 3rd years of study).

Fifty-three subjects, 8 male and 45 female, aged average 23.8 years (range 22 to 29 years) participate in this study.

Instrument

The questionnaire was developed based on curricula on core occupational competencies and skill-related competencies from FHSUL 3-year bachelor's degree programme in physiotherapy (zf.uni-lj.si/si/studenti/studijski-programi; SOK, 2020). Scales were constructed for this study for twelve core occupational competencies and twelve skill-related competencies. Students were asked how confident they were in their competencies in two settings, university, and clinic. Responses were given on a five-point scale ranging from (1) "not at all" to (5) "very much". The questionnaire contained three sections and took approximately 15 minutes to complete. Section 1 addressed background data such as sex, age, sections 2 and 3 consisted of items related to core occupational competencies and skill-related competencies.

Before completing the questionnaire, all participants were informed of the following: the purpose of the survey, that participation was voluntary, and that responses would remain anonymous. Completion and submission of the questionnaire signified informed consent. No information was collected that could be used to identify individuals; therefore, no ethical approval was required. An electronic version of

the questionnaire was sent to students via the MojaAneketa.si.web page.

Data analysis

Univariate analysis with descriptive statistics was used to interpret the results. Means and standard deviations (SD) were calculated. Bivariate correlation analysis between the two variables was used to analyze the relationship between demographic data and acquired skills. Pearson's test was used to determine the relationship between age and acquired competencies and Kendal's tau-b test was used to determine the relationship between competencies and gender ($P < .01$). Results were statistically analyzed using SPSS software Statistics 22 (IBM Corporation, United States).

Results

Students' perceptions of overall competencies averaged 3.58 (SD = .68). The average of competencies acquired at the university and in the clinical setting was 3.41 (SD = .74) and 3.74 (SD = .68), respectively. The highest mean score of core professional competencies acquired at the university was 4.21 (SD = 1.02) and 4.53 (SD = .80) in the clinical setting. The lowest mean score was 3.51 (SD = 1.01) at the university and 3.06 (SD = 1.2) in the clinical setting.

The highest mean score of skill-related competence acquired at the university was 3.60 (SD = .98) and 4.11 (SD = .93) in the clinical setting. The lowest mean score acquired at the university was 3.26 (SD = 1.02) and 3.11 (SD = 1.07) in the clinical setting. No correlation was found between student demographic characteristics and perception of competency.

A detailed overview of the scores of the individual competencies is given in tables 1 and 2.

Table 1: The scores of the core occupational competencies

Core occupational competencies		FHSUL Mean (SD)	CP Mean (SD)	Overall Mean (SD)
1	Application of theoretical knowledge in the development, maintenance and restoration of movement and functional abilities of people with limited or impaired movement due to illness or injury, at all ages	3,38 1,00	4,02 0,80	3,70 0,89
2	Ability to use theoretical knowledge in developing, maintaining, and restoring movement and functional abilities of healthy people, at all ages, in order to maintain and enhance health and prevent disease and injury	3,55 1,03	3,81 0,96	3,55 1,03
3	Development of critical and self-critical judgment for planning, implementation, and evaluation of physiotherapy process	3,34 1,04	3,91 0,86	3,63 0,95
4	Ability to connect evidence-based theory and incorporate it into practice	3,41 1,00	3,60 0,94	3,41 1,00
5	Autonomy in professional work and decision making	3,15 1,00	3,81 0,91	3,48 0,96
6	Development of a professional approach to solving professional problems	3,36 1,07	3,87 0,92	3,62 0,99
7	Ability to analyze professional problems and synthesize appropriate solutions	3,31 1,09	3,31 1,09	3,38 1,01
8	Ability to participate in an interdisciplinary team	3,15 1,29	4,04 1,12	3,60 1,20
9	Understanding of basic research methods and procedures in the field of physical therapy for participation in scientific research	3,51 1,01	3,06 1,20	3,29 1,10
10	Ability to communicate orally and in writing with colleagues and professionals from other disciplines (including in an international	3,13 1,27	3,49 1,06	3,31 1,17

	environment), enabling him/her to participate actively in group work			
11	Ability to learn independently in professional field, responsibility for own learning and awareness of the importance of lifelong learning	4.00 0.96	4.15 1.04	4,08 1,00
12	Commitment to professional ethics in physiotherapy, respect the diversity of cultures and customs	4.21 1,02	4.53 0.79	4,37 0,91

FHSU- Faculty of Health Sciences University of Ljubljana; CP-clinical placement

Table 2: The scores of the skill-related competencies

Skill-related competencies		FHSUL Mean (SD)	CP Mean (SD)	Overall Mean (SD)
1	Theoretical and practical knowledge for the independent implementation of the physiotherapy process (assessment and documentation of the functional status and abilities of the patient, identification of problems and goals, planning, selection, dosage and evaluation of appropriate physiotherapy procedures)	3,60 0,98	4,11 0,93	3,86 0,96
2	Understand and apply critical analysis and development of theories and their application in solving specific professional problems in the implementation of the physiotherapy process	3,13 0,94	3,33 1,11	3,23 1,03
3	Understanding basic knowledge from the theoretical foundations of the physiotherapy profession and linking knowledge from different areas	3,74 0,94	3,83 1,03	3,79 0,99
4	Knowledge and understanding of sciences from physiology, pathology, other medical sciences, ergonomics,	3,83 0,67	3,40 0,96	3,62 0,82

	physics, sociology, and psychology			
5	Knowledge, understanding and consideration of indications and contraindications as well as possible dangers and harmful effects of physiotherapeutic methods and procedures for individual professional problems	3,75 0,97	3,96 0,85	3,86 0,91
6	Ability to self-critically assess, critically analyze, evaluate and monitor physiotherapy interventions and their effects	3,42 0,97	3,83 0,91	3,63 0,94
7	Ability to search for new information in the physiotherapy literature and in other sciences (medicine, management, informatics, and social sciences) and relate it to physiotherapy	3,85 0,95	3,51 1,10	3,68 1,02
8	Development of non-verbal communication skills (meaning of therapeutic touch, voice, facial expressions, etc.)	3,15 1,26	4,26 0,92	3,71 1,09
9	Developing skills in teaching, guiding, instructing, encouraging, and motivating	3,23 1,12	4,11 1,01	3,67 1,06
10	Ability to effectively promote physical activity in people of all ages in the immediate and wider community	3,23 1,15	3,72 1,16	3,48 1,16
11	Ability to report new findings at professional meetings, in publications and in the media	3,85 1,15	3,75 1,01	3,80 1,08
12	Knowledge and ability to use information and communication technologies	3,26 1,02	3,11 1,08	3,19 1,05

FHSU- Faculty of Health Sciences University of Ljubljana; CP-clinical placement

Discussion

The purpose of this study was to examine how graduate physiotherapy students perceive their own professional competence acquired at university and in clinical settings. Our study showed that

perceived competence seems to be increasing in the clinical setting, implying that perhaps more is being learned about the physiotherapy profession and practical work in different work contexts. Tacit and situational knowledge plays a major role in the professional development of physiotherapy students. During the clinical placement, students gain a more accurate picture of the complexity of the workplace and are better able to compare their own competence with the demands of the workplace and the level of competence of other, more experienced staff. This is not to underestimate the role of schools and curricula, because all the basics of practical work, the "heart" of the profession - human movement and therapeutic tools - are still learned in school. Other authors also found that practical experience is important because it provides an opportunity to compare what is learned in school with the reality and complexity of the workplace (Baartman and Ruijs, 2011; Korpi et al., 2017). Further research on the effects of different training programmes seems warranted here. For example, programmes that start with clinical practise in the first year of study - this is not common in Slovenia - might show different patterns of self perceptions. Here, students might get a better impression of the complexity of the work from the beginning of the training programme, leading to a better assessment of their own competence compared to the actual work.

The graduates in our study have poorly acquired skills, especially in the use of new communication and information technologies, the development of critical thinking and the use of knowledge for scientific research. This means that the graduates lacked these experiences during their studies, and they were not sufficiently present in clinical situations. The findings concretely show that students reveal the critical aspects that need to be considered. Vissers et al., 2014 conducted the study of how the competencies were perceived using the Dublin descriptors as described in the Bologna Framework of physiotherapy bachelour programe by representatives of the physiotherapy profession and stakeholders. They found that the scientific competencies were perceived somewhat less important than the clinical and professional competencies. This is a signal to increase communication and discussion with the profession about the role of the scientist that a physiotherapist could fulfil. Especially because there is clearly a need for scientific evidence to practise evidence-based physiotherapy (ER-WCPT, 2014). Physiotherapists should be the driving forces for

innovation in the profession and should therefore acquire the necessary scientific competences. Also, regarding health insurance, it is important that a claim for reimbursement of physiotherapy can be made based on the available scientific evidence.

As in our study, many other studies use student perceptions or self-assessments as outcome measures of students' perceptions of their educational competencies (Braun et al., 2011; Korpi et al., 2017). However, such measures are often criticised for not being objective (Ward et al., 2002). Other authors have recognised and demonstrated the difference between students' perceptions or feelings about their own knowledge and skills and their actual knowledge and skills as measured, for example, by tests or assessments administered by the institution (Holden et al. 2002). Students who overestimate their own abilities tend to be careless, while students who underestimate their own abilities can be overprotective. They tend to make tasks seem more difficult than they are. Student self-perception appears to be positively related to academic motivation, learning, and achievement, regardless of actual competencies. It is a better predictor of future behaviour than what people can do, because self-perception determines what people actually do with the knowledge and skills they have (Brown et al., 2011). Conversely, negative perceptions can lead to demotivation and dropping out of school (Bandura, 1997). In our view, it is useful to measure both actual and self-perceived competencies. Actual competencies—that is, the competencies that graduates actually possess provide the most direct information about graduates' productive potential to perform adequately in the labor market, and self-perceived competencies are a judgment about a person's confidence in being able to perform certain tasks in certain situations to achieve desired goals (Allen et al., 2005).

In our study, the students' judgement of the acquired competences at the end of the study seems to be medium to high. It is possible that they are not yet able to adequately judge the complexity of the work. Other studies have also found that a number of students underestimate their own competencies at the end of their studies, suggesting that students do not yet feel confident and fully competent to enter the labour market (McDonald, 2007; Baartman and Ruijs, 2011). Previous research has shown that a slight overestimation of one's competence is beneficial, as it implies that a person will dare to face challenges (Parker, 2006). On the other hand, learners should

not grossly overestimate their own competence, since competent functioning requires harmony between self-beliefs and existing skills and knowledge (Pajares, 2002). Such overestimation seems to be favourable when entering the labour market, as learners are likely to encounter challenges and setbacks when they start working in real situations. It seems reasonable, therefore, to reduce the students' underestimation of their own competence. This could be done, for example, by giving students a sense of achievement and positive feedback during their studies; curricula and examinations could be improved to foster more self-confidence in students, e.g. through self-assessment and reflection.

The main advantages of self-assessments include the fact that they are relatively easy to administer to large samples, they can be administered simultaneously in different locations, they provide responses that are easily quantifiable and thus analyzable, and they are relatively inexpensive to produce and administer (Allen et al., 2005). As self knowledge is likely to be far from perfect and, more crucially, difficult to report objectively, this can lead to problems in terms of the reliability and validity of the results.

The major disadvantage of self-assessment as a method of data collection is the greater likelihood of measurement error. In a review of 18 studies of self-assessment in the health professions, reported correlations between self-assessed and external measures of performance administered by the institution ranged from 0.02 to 0.65 (Gordon, 1991). Basically, errors can be divided into those resulting from a more or less "intentional" manipulation of the answers by the respondents and "unintentional" discrepancies between the actual and the reported values. Unintentional measurement error occurs when the responses given in good faith by respondents do not correspond to the "true" value of the variable in question. There are several reasons why unintentional measurement error may occur (Allen et al., 2005). First, the content of the question may be unclear or ambiguous. This problem is likely to lead to discrepancies between the concept as intended by the researchers and the concept as understood by the respondents (Ward et al., 2002). Garbarsky et al., (2016) have shown that complexity and clarity are strong predictors of measurement error. Such errors seem particularly likely in the case of characteristics such as skills and competencies that are inherently complex, abstract, and difficult to delineate. Second, the source of the unintentional measurement error may also lie in the

ambiguity of the measurement scale used. Self-assessments of skills often use very general terms to indicate extreme values, such as "not at all" or "very low" and "very much" or "very high." It is unlikely that most of our respondents have a comprehensive view of the overall distribution of a particular skill. This can lead to systematic over- or underestimation of skills. In the absence of clear evidence of what 'very low' or 'very high' means, respondents will tend to use their own frame of reference. Lack of clarity in the scale used may lead certain respondents to tend to use only a small range of the scale (e.g., 3 or 4 on a 5-point scale) for all questions, which was also observed in our study.

Conclusion

The aim of this study was to investigate physiotherapy students' perceptions of their own professional competence at the end of their studies in two settings, university, and clinic. It is important to examine students' perceptions of competence to determine if there are gaps between graduates' views and educational goals. Specifically, our findings indicated that students revealed some critical aspects that need to be considered to support them in developing their competencies. To get a more accurate picture of the developmental process of individual students during a three-year programme, longitudinal research would be very valuable. For example, by asking about students' perceptions at the beginning of their studies and in the following years of study, or after graduation and after completing internships. The main limitation of this study is the small sample size, so our results cannot be generalised, and the fact that the study was conducted in only one discipline. We believe that the findings on physiotherapy students' perceptions of their own competence may be relevant to other areas of higher education. In fields such as physiotherapy, medicine and nursing, professionals require a wide range of competencies and practical skills when working with patients. More research is needed on the development and perception of competence as opposed to isolated knowledge and skills. As competence development is the main goal of education, it is important for all stakeholders to have an explicit understanding of what competence is in the context. There is a need for conceptual analysis of how teachers, students, and curriculum developers conceptualise the competencies required in their field.

Acknowledgments: The author sincerely thanks all the physiotherapy students who participated in this study and Natalija Snedec, PT for data collection.

No financial or/and other support was provided for the preparation of the manuscript.

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