Transversal skills : the self-perceptions of students at University of Split School of Medicine

Svensson, Sara

UNIVERSITY OF SPLIT
SCHOOL OF MEDICINE

SARA SVENSSON

TRANSVERSAL SKILLS – SELF-PERCEPTIONS OF STUDENTS AT UNIVERSITY OF SPLIT SCHOOL OF MEDICINE

DIPLOMA THESIS

Academic year:
2020/2021

Mentor:
Assist. Prof. Sandra Kostić, PhD

Split, September 2021

TABLE OF CONTENTS

Assist. prof. Sandra Kostić, PhD has been the perfect teacher, mentor and thesis supervisor. I am very grateful for her guidance, pedagogical skills, constructive feedback and kind support. Thank you, Sandra.

I would also like to thank all the students that participated in this study.

And finally, I am forever thankful for the years of unwavering support provided by Madelene & Ulf Svensson, Emma Svensson, Ella Svensson & Leif Bengtsson. I could not have done this without you.

1. INTRODUCTION

1.1. Competence and skills

The European Commission states in the European Pillar of Social Rights that all European citizens have the right to a quality education and training, in addition to lifelong learning to develop and maintain skills allowing a successful transition in the labor market and inclusion in society (1).

An important part of the European Commission's framework to promote lifelong learning is the definition of certain competences that are intertwined and enable development interdependently as well as independently (2).

The concept of competence can be defined as a constellation of knowledge, skills, and attitudes required to maneuver professional situations (3).

Frey et al., designate the specific situation the determinator of which constellation required, signifying the benefits of developing a wide set of competences in the rapidly changing knowledge-based economy (4).

The European union defines knowledge as a collection already established data, concepts, notions and theories that support the understanding of a specific topic in the council recommendation of 22 May 2018 on key competences for lifelong learning (2).

A skill can be defined as an ability to perform complex actions with ease and adaptability that achieves desired results. These abilities are typically learned and gained through training (5,6).

Attitudes can be considered the mental position or feeling towards action or reaction to specific situations, theories and ideas (2).

Globalization and the technological revolution leading to society rapidly evolving, requires constant development of new competences. Noticeably, there has been a shift of focus to the development of transversal skills, also referred to as soft skills. This is due to their transcending applicability as opposed to hard skills, or technical, job-specific skills such as memorization of detailed data that instead could be retrieved efficiently by utilizing a constellation of transversal skills (7).

The application of previously attained knowledge and skills to a new situation occurs in a social context. *Abuzour et al.,* identified a sufficient basic foundation of knowledge, support from colleagues and adherence to guidelines as conditions facilitating the transfer of skills attained during education to the workplace (8).

The acquisition of job-specific skills necessitates the utilization of certain transversal skills, implying that these skills are not only linked, but they also strengthen one another and develop interdependently (9).

1.2. Defining transversal skills

Transversal skills are abstract abilities that are required for learners' continuous development and adaption to change. They are not related to any specific jobs or academic disciplines and are considered transferable due to their broad applicability that is a valuable asset in any area of knowledge (10-11).

The European Commission has defined eight transversal skills as considered key abilities to successfully adapt to changes and to lead meaningful and productive lives: (1) Communication in the mother tongue; (2) Communication in foreign languages; (3) Mathematical competence and basic competences in science and technology; (4) Digital competence; (5) Learning to learn; (6) Social and civic competences; (7) Sense of initiative and entrepreneurship; (8) Cultural awareness and expression (2).

Communication can be defined as formulating, transmitting, receiving, and processing information, and responding appropriately.

The council of the European Union described this competence as the ability of conveying arguments in a convincing way appropriate to the context, encompassing critical thinking and ability evaluate information (2).

Verbal communication incorporates two important abilities: Effective listening and speaking. Effective listening means that the receiver of a message not only listens without interrupting the speaker, but also give their full attention by inquiring and reflecting on message received (12).

Written communication is the ability to exchange information with the written word. Effective written communication involves conveying messages with written words that are clear, concise and correct, while using a simple language easy to understand.

Visual communication is a form of communication that uses visual elements to express ideas and information. The ability to express and understand data in form of graphs, charts and illustrations are examples of visual communication often utilized in research work.

Literature searching is the process of systematically searching literature for predefined information. It is considered a key step when performing research where its main purpose is to

formulate questions with the foundation in the already available literature published on the topic (13).

Information technology literacy is also referred to as digital literacy. *The American Library Association's (ALA) Digital Literacy Task Force* defines digital literacy in as the capability to use computers and information technologies to find, assess, produce, and communicate information. This competence requires both cognitive and technical skills (14).

Data analysis is considered the process of interpreting, organizing, detecting, and correcting errors, and creating models (algorithms) of raw data that has been collected.

English language proficiency is the ability to communicate in English well enough to accurately convey the intended message.

It involves the ability to comprehend, express and interpret messages in both oral and written form, specifically executed through listening, speaking, reading and writing (2).

Teamwork is the concept of a group of individuals collaborating to reach a common goal efficiently.

In the report *Developing a European Framework for the Personal, Social & Learning to Learn key competence,* collaboration and teamwork are singled out as promoters of success, resourcefulness and efficiency in development of social learning experiences, higher-level thinking and problem solving. The benefits of teamwork in nonformal settings were also noted. It can help forming and maintaining caring relationships and counteract negative mental states through social connection and shared accomplishment, having a positive influence on the general wellbeing (7).

Problem-solving is defined as a behavioral process that both provide alternatives on how to respond to a present problem and help navigate towards the response with the highest probability to effectively solve the problem (15). This process requires having social skills, self-confidence, decision-making, and endurance (16).

Self-organization in the context of the learning environment is the reflective process of learning independently utilizing tools and templates along with previously acquired skills and knowledge.

Raush et al. highlighted the importance of self-esteem, academic commitment and time-management when developing self-organizational learning skills (17).

Time-management involves structured planning and controlling the division of allocated time between activities, increasing effectiveness, efficiency, and productivity.

In *Assessing Learning-to-learn: A FRAMEWORK* published by the Centre for Educational Assessment Helsinki University, the authors define learning-to-learn as to referring to

the varied cognitive and emotional factors that are pivotal to the transfer of previously learned skills when approaching new situations and learning opportunities. In short, the skill of learning-to-learn is the willingness and tools to acquire new knowledge and skills (18).

Hoskins et al. argued that Learning-to-learn should be considered a competence, and not a skill as it also involves additional components such as certain emotions, beliefs and behaviors (19).

Another concept of defining Learning-to-Learn is the knowledge of cognition combined with well-developed self-regulatory mechanisms. This concept focuses on analytical qualities such as knowing what one does and does not know, as well as planning, evaluating and revising learning strategies (19).

Empathy can be defined as the ability to understand others' feelings or see situations from others' perspective. It is considered to be the key foundation for development of all social skills (7).

Empathy embraces three aspects. The appropriate emotional response to and the understanding of the mental states of others. These two aspects are referred to as emotional respectively cognitive empathy. Lastly, understanding and taking on others' point of view (perspective change) is also considered an aspect of empathy (20).

In patient care empathy is principally defined as a cognitive quality that facilitates the physicians understanding of the patients' distress, communication of the understanding and intention to provide support (21).

1.3. Relevance of developing transversal skills for healthcare professionals

In health care there is a wide spectrum of different team constellations – all from intimate trauma teams working closely together and consultants aiding in diagnostics, to extensive multiteam systems (collection of teams working towards the same goal) (22).

In the professional life of physicians, time-management is a crucial skill to reduce stress and increase productivity. Yet the educational institutions frequently fail at preparing students for a career with high unpredictability, irregular schedules or duties, combined with emotional and physical fatigue (23).

Pitre et al. argues that medical schools tend to prioritize the development of job-specific knowledge and skills. This often leads to students and trainees neglecting learing how to maneuver individual time allocation and task prioritization, two skills that are important to attain professional adeptness. Consistent inability to recognize limitations and division of time may

lead to the development poor time-management. This habit can cause added stress and declined productivity (23).

In the report on key competencies, it is noted that several of the concepts that can be regarded as parts of learning to learn are being discussed in many countries. It is clear that self-initiated and intentional learning is crucial when advancing in both personal and professional life. This theory is plausible at all stages of life. Due to the recognition of the lifelong importance of development of transversal skills, attention is now focused on the importance of the ability to understand and regulate one's own thinking and learning progression. By developing this metacognitive skill, the awareness of as to how and why different types of knowledge and skills are acquired is increased. This enables the position to choose the type of learning and circumstances that suits the individual the best and allows for adaption and progression along the way (24,19).

Mercer et al. emphasized the importance of developing empathy during medical school by stating that it is a fundamental skill when providing patient-centered care. It facilitates the understanding of the patient's condition, perspectives, and emotional state. It is also an important tool to communicate the understanding and confirm the accuracy, alternatively allowing the patient to correct any misconceptions or add details accidentally left out. By understanding the patient, the physician can then act accordingly (25).

1.4. Tools to acquire transversal skills in medical education

As transversal skills are general, they can be considered cross-curricular and independent from specific subjects during education. Rather than the focus of education remaining on teaching, emphasis should shift towards learning and the management of one's own learning, social and interpersonal relations and communication (26).

When discussing the teaching approach of transversal skills and competences, Sà and Serpa concludes that in order for the education to correspond to the students' qualities and needs meanwhile meeting the demands of the job market, the institutes for higher education need to promote the development of transversal competences. This requires the curriculum to be based on active teaching methodologies where the students learn and master theoretical components of the education in contexts mimicking real work life scenarios (27).

Watson et al. developed guidelines on how to incorporate the development of relevant transversal skills during medical school (28).

It is important to establish which transversal skills that will be necessary for the medical student's future career, and to define the clear goal ("extent of mastery"). Some skills overlap, others are more relevant for specific specializations or stages of career, than others (28).

Different skills might be of different priorities depending on the university curriculum or stage of career. Therefore, rating the importance of the transversal skills can dictate when and how it is learnt (28).

By individualizing the educational process, each student's specific weaknesses can be targeted. This is done through self-evaluation to calibrate the self-confidence in transversal skills. The students need to understand why these skills are being taught and reflect upon what skills they need to develop while framing it in a clinical context (28).

The students' motivation to develop transversal skills can be maintained by prioritizing the clinical relevance, despite these skills' applicability from medical to non-medical fields (28).

By repeating and varying the relevant contexts the skills are taught throughout the education can lead to spiraling reflective practice – the student learns how to reflect on what skills are needed and why, and how to appropriately apply them in their future practice (28).

Certain skills such as communication are better taught implicitly by placing the students in authentic work settings where they need to talk to patients and other clinicians. In this context, this learn-by-doing approach is more effective than if taught in a classroom (28).

Other skills such as data analysis, on the other hand, is better taught explicitly. With a structured approach the teachers can explain the different terms and statistical methods (28).

The structural approach on how to learn transversal skills also differ. Certain skills need to be taught stepwise such as research skills. Other skills, such as communication, can be taught through an immersive approach (28).

Problem-based learning is a classroom methodology used in many medical schools across the world. It places problem-solving activities as a central role in education, allowing for students to take the role of researchers discovering knowledge meanwhile teachers act as facilitators of the knowledge and skill development of the students (29).

In medical school, the authentic real-world problems to solve can be presented as patient case scenarios where the students work in group to solve complex diagnoses and patient management. In this learning process it's important for the students to be encouraged to reflect on their experiences and recognize the concepts and skills they are learning (29).

In problem-based teaching clinical cases are presented to students in an authentic manner. Firstly, the presenting symptoms that the patient reports are introduced to students. Students then get to make the decision on whether they need more information. They also need to decide on what information they require and then ask for it. This data is available from patient records and is indexed by traditional questions included in anamnesis (29).

When attempting to interpret the patient's ailment and managing the care the student practices many transversal skills, especially problem solving (29).

By utilizing a white board or other tools enabling visual overview of the problem students keep track of confirmed facts, diagnostic hypotheses, suggestions of possible treatments and issues they lack understanding of and need to learn more about. This process involves the utilization and development of many transversal skills due to the autonomy of the student while learning (29).

The methodology the students follow has a structured approach to the problem. Firstly, students record their previous combined knowledge on the topic from which they generate hypotheses. The next step is to identify patient data is missing and what issues the students need to research in order to be able to approach and solve the clinical case. The students then divide the research work between them before once again convening to approach the problem with their newly gained knowledge. They will then discard and/or revise previously made hypotheses, and/or generate new ones. This cycle continues until the students are content with their chosen solution. When presenting the chosen solution, the students will be presented with expert opinions on the matter. Then the methodology and conclusion will be discussed, and if the solution presented by the expert differs the discussion will include pros and cons of the different approaches (29).

Case-based reasoning is a teaching model that uses previous experience to guide the understanding of a new problem, formation of a solution or analyzing the potential effects of a new situation by examining the effects of a similar old situation. This methodology of learning requires the ability to evaluate what lessons can be learnt from previous knowledge and how to adapt these lessons in order to apply them in the new context (28). This requires the utility and development of transversal skills, for example creativity, team-work or self-organizational skills, and problem-solving.

When learning through work-based projects (apprenticeship) the student gets the opportunity to apply academic knowledge and practice a range of skills – both job-specific and transversal – in "real life settings". By working close to experienced clinicians, the students can learn the reasoning behind a variety of relevant contexts (27).

Project-based learning is a pedagogy involving active classroom learning. Typically, it's organized around real-world projects over an extended period of time. This form of teaching engages the students to encounter real life problems and find solutions. This form of teaching leads to not just job-specific skills, but also to the development of several transversal skills such as critical thinking, teamwork, organizational skills, problem-solving skills, communication, acceptance of different perspectives and critical analysis (27).

1.5. Tools to assess (evaluate) transversal skills in medical education

There is a clear correlation between the development of transversal skills in high school students and their likelihood to achieve higher levels of education. Therefore, the Organisation for Economic Co-operation and Development (OECD) has developed a standardized survey to measure 15-year-olds' ability to utilize knowledge and skills to meet real life challenges – Programme for International Student Assessment (PISA) (30).

This survey is comprised of a test with both multiple choice and open questions assessing the students' abilities in reading, mathematics & science. By presenting the questions in form of real-life situations, this survey also assesses global competence which builds on specific cognitive and social skills, including data analytics and literacy, communication, empathy, conflict resolution and adaptability – all in an intercultural context (30).

The survey also contains a questionnaire seeking information concerning the students' attitudes, values and beliefs. The questionnaire also covers relevant information regarding the students' homes, schools and learning experiences (30).

Some countries have also distributed additional questionnaires evaluating teachers and their teaching practices, parents and their perceptions and involvement in their children's education. Other additional questionnaires have evaluated the students' self-assessed computer skills, expectations for further education and general well-being (30).

Four OECD member countries (Australia, Canada, Denmark and Switzerland) conducted cohort studies following the lives of students taking PISA in early 2000s. A correlation between a higher PISA score at the age of 15 and the likelihood to achieve higher levels of education 10 years later at the age of 25 was found, even after accounting for factors such as socio-economic status of the students' household (30).

Currently there is no standardized psychometric tool to measure the execution of transversal skills in medical students. When assessing professionalism in medical students both spe-

cific and transversal skills are important. Cognitive abilities are reflected in academic accomplishments, the ability to recall and understanding factual information during examinations, and procedural skills. These are all examples of specific skills (21).

Competences are characteristically measured in relationship to authentic learning tasks. Assessing the students' actions and reactions when being presented by problems in a real-life setting enables measuring both hard and soft skills (19).

An adapted form of the College Student Experiences Questionnaire (CSEQ) was used to compare medical students research skill acquisition (31).

This adapted survey compared the student characteristics such as age, gender, GPA, which year of study they were enrolled in, and whether or not they have participated in research projects or elective research courses. The demographic data was then compared to the amount of time and effort the students spend on learning activities (31).

Subsections of the questionnaire investigated self-perception on execution and devotion of time to learn. Information retrival skills, critical judgement, writing skills and statistical skills. In the overall gains section the students opinions on their progress in evidence based medicine and research skills was surveyed (31).

By analysing the results the authors could investigate the correlation between the acquisition of research skills, both specific and transversal, and different medical curriculums, courses and experiences.

Higher education institutions, integrates research activities into the evidence-based medical education for all students from the first year of their studies. At USSM, there is also an opportunity for students to participate in research projects as an extra-curricular activity.

Research activities include collection and processing of data and analyzing it by utilizing logic reasoning and prior experience. Eleven selected skills that can be acquired through research activities are being investigated in this study. They have been classified into three main categories:

- Communication skills (CS) involving (1) written communication; (2) verbal communication; (3) visual communication.
- Research skills (RS) such as (4) literature searching; (5) information technology; (6) data analysis; (7) English language proficiency
- Organizational/learning skills (OS) encompassing (8) teamwork; (9) problem-solving; (10) time-management/self-organization; (11) learning to learn

As there is a well-established correlation between affective skills and patient compliance, satisfaction, and treatment outcome (32), it was determined to be of relevance to include empathy as the twelfth skill development to be investigated in students enrolled at USSM.

2. OBJECTIVES

The aim of this cross-sectional study was to investigate and compare the attitudes towards a selection of transversal skills considered relevant for the learning and future careers in health professions of students at the University of split school of medicine (USSM).

This study's objective were: (1) To investigate and compare the self-perception about importance and ability to execute transversal skills of students enrolled in the medical faculty (2) To compare the objective above by study programs (medicine; dental medicine; pharmacy; and medical program in English), age, GPA, work experience and participation in research activities during study years and (3) evaluate the self-perceived ability to execute transversal skills over the progression of the medical education.

Our research hypotheses for this study was that (1) students that have participated in research activities during their study years overall rank the personal importance, self-perceived ability to execute and the importance for clinical practice of transversal skills higher than their peers without research experience, (2) students that have participated in research activities and/or have paid work experience rank the personal importance, self-perceived ability to execute and the importance for clinical practice of communication skills and organizational/learning skills higher than their peers without any such experiences, (3) students of the higher years of studies overall rank the personal importance, self-perceived ability to execute and the importance for clinical practice of transversal skills higher than students of the lower years of study, and (4) there is no difference between the study programs.

3. MATERIALS AND METHODS

A cross-sectional study was designed to investigate medical students' self-perception of the importance of development and execution of transversal skills. The subjects investigated were students enrolled at University of Split School of Medicine (USSM) during the academic year of 2020/2021. Students from all four study programs and of all years of study (1-6 for medicine, dental medicine, and medical studies in English. 1-5 for pharmacy) were deemed eligible as participants.

Among the 1200 students enrolled at MEFST, 221 (18.4%) have participated in the study. The participation rate of was 17.9% (50 out of 280 students) for medicine in English, 11.7% (67 out of 571 students) for medicine in Croatian, 33.8% (67 out of 198 students) for dental medicine, and 24.5% (37 out of 151 students) for pharmacy program. From first year of study 9.5% (21 out of 220 students) participated; second year 26.8% (62 out of 231); third year 15% (31 out of 207); fourth year 11.8% (22 out of 186); fifth year 24.8% (50 out of 202 students); and sixth 22.7% (35 out of 154 students).

An online version of an anonymous and validated questionnaire was created in Google Docs and administered to the students for a period of a month, from May to June 2021. The transversal skills included in the questionnaire was adapted from the "Importance of Transversal Skills for Clinical Practice" (ITS4CP) developed by *Ribeiro et al* (33). The participation was voluntary and without compensation.

In the first part of the questionnaire the aim of the study is explained. Participants were also informed about the anonymity of their addition and are requested to answer questions fairly and openly.

Next part of the questionnaire allowed the students to submit their demographic data such as age, study program, years of study, average Croatian academic grade: 2.0 – 2.4, 2.5 – 3.4, 3.5 – 4.4 and 4.5 – 5 (2=sufficient, 3=good, 4=very good, 5=excellent), participation in research activities, work experience and their familiarity with the term transversal skills. This data was then used to analyze and identify potential factors influencing students' perception of importance and ability to perform selected transversal skills.

In the third part the definition of transversal skills is explained.

Lastly, in the final part of the questionnaire the students' perceived importance of 12 selected transversal skills in both private and clinical settings was assessed following the Likert scale: 1 (unimportant), 2 (not very important), 3 (important) and 4 (very important). The self-perceived ability to execute the selected 12 transversal skills was evaluated following the Likert scale: 1 (poor), 2 (insufficient), 3 (sufficient) and 4 (good).

The results were collected, and data were analyzed using Microsoft Excel and JASP 0.9.2.0. A descriptive analysis was conducted with results expressed in frequencies and percentages for dichotomous variables, and as means with standard deviations (SD) for continuous variables. The percentages were calculated for every outcome. The results for the Likert scale self- perception questions on transversal skills were grouped (1 and 2 as first group, and 3 and 4 as the second group). A nonparametric χ^2 test was used to assess differences and correlations between groups and variables. Our study determined statistical significance to be $P<0.05$.

Odds ratio (OR) was used to estimate the magnitude of the association between the perceived ability to perform each transversal skill and several factors. Logistic regression adjusted for all variables was used to estimate the OR and the respective 95 % confidence interval.

This study was approved by the USSM Ethical committee, approval number: 2181-198-03-04-21-0063.

The questionnaire is added as the supplementary material of the thesis.

4. RESULTS

In this study, 221 (18.417%) out of 1200 students from four programs participated: 50 (17.857%) of medical studies in English, 67 (11.734%) of medical studies in Croatian, 67 (33.838%) of dental medicine, 37 (24.503%) of pharmacy program (Table 1).

Table 1. The number of students (N) that participated (SP) in the research and total number of enrolled students (E) per year of medical studies in English, medical studies in Croatian, dental medicine and pharmacy, academic year 2020/2021

SY	Med. Eng.		Med. Hr.		Dent. Med.		Pharm.		Total
	SP	E	SP	E	SP	E	SP	E	SP
1	7	57	2	101	5	32	7	30	21
2	9	64	25	102	20	34	8	31	62
3	15	56	6	93	5	28	5	30	31
4	0	34	7	92	9	30	6	30	22
5	10	41	12	88	17	43	11	30	50
6	9	28	15	95	11	31	/	/	35
Total	50	280	67	571	67	198	37	151	221

Data is presented as number N
SY=year of study, SP=study participants, E=students enrolled, Med. Eng.=medicine in English, Med. Hr.=medicine in Croatian, Dent. Med.=dental medicine, Pharm.=pharmacy

The mean age of the participants was 23 (SD±3), with minimum of 18, and maximum being 41. First year students were 19 years old on average, second year students 20, third year students 21, fourth year students 22, fifth 23 and sixth 24 years old.

Regarding the GPA of participants, it was found the lowest GPA was mostly among first-year students of all study programs, and the highest was reported in general by the final-year students (data not shown).

There was a significant difference between GPAs for students of different study programs (χ^2=20.491, *P*=0.015) (Table 2).

Students from medicine in English program reported that the highest GPA was among the fifth- and sixth-year students; students studying medicine in Croatian reported highest among fifth-year students; From dental medicine, the lowest GPA was between the first-year students, and the highest among the sixth-year students; and pharmacy students reported third-year students having the highest GPA (data not shown).

Table 2. The GPA of students of the study programs at USSM that participated in our study

GPA	Med. Eng.	Med. Hr.	Dent. Med.	Pharm.	Total
	SP=50	SP=67	SP=67	SP=37	SP=221
2.0 – 2.4	0 (0)	4 (6)	0 (0)	0 (0)	4 (1.8)
2.5 – 3.4	17 (34)	11 (16,4)	8 (11.9)	6 (16.2)	42 (19)
3.5 – 4.4	29 (58)	44 (65.7)	54 (80.6)	27 (73)	154 (69.7)
4.5 – 5.0	4 (8)	8 (11.9)	5 (7.5)	4 (10.8)	21 (9.5)

Data is presented as number N (%)
GPA=grade point average, Med. Eng.=medicine in English, Med. Hr.=medicine in Croatian, Dent. Med.=dental medicine, Pharm.=pharmacy, SP=study participants

Table 3. The number of students (N) that participated in research activity during their studies per year and study program at USSM, academic year 2020/2021.

SY	Med. Eng.	Med. Hr.	Dent. Med.	Pharm.	Total
	SP=50	SP=67	SP=67	SP=37	SP=221
1	0 (0)	0 (0)	1 (20)	3 (42.9)	4 (19)
2	4 (44.4)	4 (16)	4 (20)	0 (0)	12 (19.4)
3	4 (26.7)	0 (0)	1 (20)	0 (0)	5 (16.1)
4	0 (0)	1 (14.3)	0 (0)	0 (0)	1 (4.6)
5	0 (0)	3 (25)	4 (23.5)	2 (18.2)	9 (18)
6	0 (0)	5 (33.3)	3 (27.2)	/	8 (22.9)
Total	8 (16)	13 (19.4)	13 (19.4)	5 (13.5)	39 (17.7)

Data is presented as number N (%)
SY=year of study, Med. Eng.=medicine in English, Med. Hr.=medicine in Croatian, Dent. Med.=dental medicine, Pharm.=pharmacy, SP=study participants

Table 4. The number of students (N) that declare to have had work experience during their studies per year and study program at USSM, academic year 2020/2021.

SY	Med. Eng.	Med. Hr.	Dent. Med.	Pharm.	Total
	SP=50	SP=67	SP=67	SP=37	SP=221
1	4 (57.1)	0 (0)	3 (60)	3 (42.9)	10 (47.6)
2	8 (88.9)	21 (84)	13 (65)	5 (62.5)	47 (75.8)
3	7 (46.7)	6 (100)	3 (60)	2 (40)	18 (58.1)
4	0 (0)	7 (100)	5 (55.6)	4 (66.7)	16 (72.7)
5	9 (90)	8 (66.7)	11 (64.7)	7 (63.6)	35 (70)
6	8 (88.9)	11 (73.3)	9 (81.8)	/	28 (80)
Total	8 (16)	53 (79.1)	44 (65.7)	21 (56.8)	154 (69.7)

Data is presented as number N (%)
SY=year of study, Med. Eng.=medicine in English, Med. Hr.=medicine in Croatian, Dent. Med.=dental medicine, Pharm.=pharmacy, SP=study participants

Table 5. The number of students (N) that declared the familiarity with term transversal skills per year and study program at USSM, academic year 2020/2021.

SY	Med. Eng.	Med. Hr.	Dent. Med.	Pharm.	Total
	SP=50	SP=67	SP=67	SP=37	SP=221
1	1 (14.3)	1 (50)	0 (0)	2 (28.6)	4 (19)
2	4 (44.4)	3 (12)	3 (15)	1 (12.5)	11 (17.7)
3	4 (26.7)	1 (16.7)	0 (0)	0 (0)	5 (16.1)
4	0 (0)	1 (14.3)	2 (22.2)	3 (50)	6 (27.3)
5	1 (10)	2 (16.7)	5 (29.4)	2 (18.2)	10 (20)
6	2 (22.2)	2 (13.3)	0 (0)	/	4 (11.4)
Total	12 (24)	10 (14.9)	10 (14.9)	8 (21.6)	40 (18.1)

Data is presented as number N (%)
SY=year of study, Med. Eng.=medicine in English, Med. Hr.=medicine in Croatian, Dent. Med.=dental medicine, Pharm.=pharmacy, SP=study participants

The personal importance of written communication is more visible among senior year students (97% to 100% of fourth- to sixth-year students, unlike 90% to 95% of first- to third-year students) (data not shown).

Similar was observed regarding personal importance of oral communication (94.2% of the first-year students, and by 100% of fourth- to sixth-year students) (data not shown).

Similar trend was seen regarding most of the transversal skills, with the exception of data analysis where 83% to 86% of the first- to third-year students, and 72% to 80% of the fourth- to sixth-year students rated this skill as important or very important (data not shown).

The participation in research activities was associated with an increasing odd of familiarity with the term transversal skills. Almost 3-fold increase in odds of familiarity with the term was observed in the students that participated in extracurricular research activities; OR (95%CI) =2.87 (1.31-6.27), $P<0.001$ (data not shown).

Regarding personal importance of written communication skills, a decrease in odds of a good self-perceived performance was observed in students with research experience; OR (95%CI) = 0.51 (-1.32 - -0.02), $P=0.04$ (data not shown).

In the population with paid work experience there was an increased prevalence of students reporting visual communication as a skill of personal importance. An almost 2-fold increase in odds was observed in the students that had previous work experience, OR (95%CI) =1.52 (0.04-0.80), p=0.03, as well as the ability to execute it, OR (95%CI) =1.53 (0.03-0.81), $P=0.03$) (data not shown).

Table 6. The self-perceived personal importance of the presented transversal skills. The table shows the number and percentage of students of each year of study and study program that reported the stated skills as important or very important.

Skill	Med. Eng.	Med. Hr.	Dent. Med.	Pharm.	Total
	SP=50	SP=67	SP=67	SP=37	SP=221
Written com.	46 (92)	64 (95.5)	67 (100)	35 (94.6)	212 (95.9)
Oral com.	49 (98)	67 (100)	67 (100)	36 (97.3)	219 (99.1)
Visual com.	47 (97)	62 (92.5)	61 (91)	34 (91.9)	204 (92.3)
Lit. search.	47 (94)	64 (95.5)	62 (92.5)	33 (89.2)	206 (93.2)
IT	44 (88)	59 (88.1)	61 (91)	34 (91.9)	198 (89.6)
Data anlys.	42 (84)	54 (80.6)	53 (79.1)	32 (86.5)	181 (81.9)
Eng. prof.	47 (94)	64 (95.5)	65 (97)	36 (97.3)	212 (95.9)
Teamwork	48 (96)	66 (98.5)	63 (94)	35 (94.6)	212 (95.9)
Prob.-solv.	50 (100)	67 (100)	67 (100)	37 (100)	221 (100)
Time Mngmt/ self-org.	48 (96)	66 (98.5)	67 (100)	37 (100)	218 (98.6)
Impr. learn.	46 (92)	65 (97)	64 (95.5)	36 (97.3)	211 (95.5)
Empathy	49 (98)	66 (98.5)	66 (98.5)	36 (97.3)	217 (98.2)

Data is presented as number N (%)
Abbreviations: Med. Eng.=medicine in English, Med. Hr.=medicine in Croatian, Dent. Med.=dental medicine, Pharm.=pharmacy, SP=study participants, com.=communication, Lit. search.=literature searching, IT=information technology, anlys.=analytics, Eng. prof.=English proficiency, prob.-solv.=problem solving, Mngmt=management, self-org.=self-organization, impr. learn.=Improving your learning (learning to learn)

When evaluating the self-perceived execution ability of the respondents, 71% of the first-year students reported their time management/self-organization abilities to be sufficient or good. This perception increased to 80% of the fifth-year students, but then decreased to 74% of the sixth-year students (data not shown).

Of the sixth-year students, 88.9% of the students of the Medicine program in English rated their self-perceived time-management/self-organization execution abilities to be sufficient or good, unlike students of the dental program (63.3%) and students of medicine in Croatian (40%).

There was a statistical difference between the students of different studies and their indication of the ability to execute problem-solving: 86.5% of pharmacy students, unlike 97% dental students or 98% of medicine students (both in English and Croatian studies) (χ^2 =10,336, p=0.016).

All first-year students (100%) indicated they had sufficient or good ability to execute oral communication, unlike 86% of fifth-year students and 91% of fourth- and sixth-year students. The same trend was visible for most of the presented skills. For example, 81% of first-year students reported to have good or sufficient ability to execute literature searching, unlike the fifth-year students (72%) and sixth-year students (only 60%). Furthermore, for information technologies 86% of the first-year students and 66% of the sixth-year students reported to have sufficient or good self-perceived execution ability (data not shown).

When the self-perceived execution ability of data analysis was compared across study years, almost 86% of the first-year students, 45% and almost 55% of second- and third-year students reported their skills as sufficient or good, unlike the 36%, 44% and 45% of their colleagues in fourth to sixth year (χ^2 =14.161, *P*=0.015) (data not shown).

Regarding the ability of students to execute written communication skills, a decrease in odds of a sufficient or good self-perceived performance was observed in students who participated in research activities; OR (95%CI) = 0.47 (-1.19 - -0.32), *P*<0.001 (data not shown).

Table 7. The self-perceived execution ability of the presented transversal skills. The table shows the number and percentage of students of each year of study and study program that reported the stated skills as sufficient or good.

Skill	Med. Eng.	Med. Hr.	Dent. Med.	Pharm.	Total
	SP=50	SP=67	SP=67	SP=37	SP=221
Written com.	44 (88)	60 (89.6)	63 (94)	36 (97.3)	203 (91.9)
Oral com.	46 (92)	63 (94)	58 (86.6)	30 (81.1)	197 (89.1)
Visual com.	45 (90)	61 (91)	60 (89.6)	36 (97.3)	202 (91.4)
Lit. search.	34 (68)	44 (65.7)	43 (64.2)	24 (64.9)	145 (65.6)
IT	33 (66)	46 (68.7)	44 (65.7)	31 (83.8)	154 (69.7)
Data anlys.	31 (62)	32 (47.8)	29 (43.3)	17 (46)	109 (49.3)
Eng. prof.	48 (96)	63 (94)	61 (91)	37 (100)	209 (94.6)
Teamwork	48 (96)	62 (92.5)	59 (88.1)	33 (89.2)	202 (91.4)
Prob.-solv.	49 (98)	66 (98.5)	65 (97)	32 (86.5)	212 (95.9)
Time Mngmt/ self-org.	36 (72)	49 (73.1)	51 (76.1)	26 (70.3)	162 (73.3)
Impr. learn.	44 (88)	55 (82.1)	53 (79.1)	30 (81.1)	182 (82.4)
Empathy	49 (98)	65 (97)	65 (97)	36 (97.3)	215 (97.3)

Data is presented as number N (%)
Abbreviations: Med. Eng.=medicine in English, Med. Hr.=medicine in Croatian, Dent. Med.=dental medicine, Pharm.=pharmacy, SP=study participants, com.=communication, Lit. search.=literature searching, IT=information technology, anlys.=analytics, Eng. prof.=English proficiency, prob.-solv.=problem solving, Mngmt=management, self-org.=self-organization, impr. learn.=Improving your learning (learning to learn)

The students were asked to indicate the importance of the presented skills for clinical practice (Table 8).

Literature searching was indicated as important or very important for clinical practice by 95% of the first-year students, unlike 82% and 83% of the fifth- and sixth-year students; and similar tendency was noted when comparing responses regarding information technologies (95% of first-year and 86% of the sixth-year students) and data analysis (90% first-year and only 71% of the sixth-year students) (data not shown).

Regarding the clinical importance of written communication skills, a decrease in odds of a good performance was observed in students who participated in research activities; OR (95%CI) = 0.65 (-0.78 - -0.08), *P*=0.02.

Similarly, the responses relating to visual communication skills show a decrease in odds of a perceived clinical importance in students with research experience; OR (95%CI) = 0.45 (-1.36 - -0.23), *P*<0.001.

Even though statistically non-significant, the clinical importance of English proficiency was associated with an increased odds of participation in research activities; and almost a 2-fold increase in odds of familiarity with the term was observed in the students that participated in research, OR (95%CI) =1.73 (-0.08 - 1.18), *P*=0.09 (data not shown).

Table 8. The self-perceived importance of the presented transversal skills for clinical practice. The table shows the number and percentage of students of each year of study and study program that reported the stated skills as important or very important.

Skill	Med. Eng.	Med. Hr.	Dent. Med.	Pharm.	Total
	SP=50	SP=67	SP=67	SP=37	SP=221
Written com.	41 (82)	56 (83.6)	56 (83.6)	32 (86.5)	185 (83.7)
Oral com.	49 (98)	67 (100)	67 (100)	36 (97.3)	219 (99.1)
Visual com.	48 (96)	64 (95.5)	62 (92.5)	34 (91.9)	208 (94.1)
Lit. search.	40 (80)	54 (80.6)	57 (85.1)	34 (91.9)	185 (83.7)
IT	40 (80)	56 (83.6)	58 (86.6)	31 (83.8)	185 (83.7)
Data anlys.	41 (82)	51 (76.1)	55 (82.1)	32 (86.5)	179 (81)
Eng. prof.	44 (88)	62 (92.5)	61 (91)	32 (86.5)	199 (90)
Teamwork	48 (96)	67 (100)	61 (91)	36 (97.3)	212 (95.9)
Prob.-solv.	50 (100)	66 (98.5)	65 (97)	37 (100)	218 (98.6)
Time Mngmt/ self-org.	49 (98)	67 (100)	66 (98.5)	37 (100)	219 (99.1)
Impr. learn.	42 (84)	63 (94)	62 (92.5)	34 (91.9)	201 (91)
Empathy	50 (100)	67 (100)	65 (97)	35 (94.6)	217 (98.2)

Data is presented as number N (%)
Abbreviations: Med. Eng.=medicine in English, Med. Hr.=medicine in Croatian, Dent. Med.=dental medicine, Pharm.=pharmacy, SP=study participants, com.=communication, Lit. search.=literature searching, IT=information technology, anlys.=analytics, Eng. prof.=English proficiency, prob.-solv.=problem solving, Mngmt=management, self-org.=self-organization, impr. learn.=Improving your learning (learning to learn)

5. DISCUSSION

In this study we investigated self-perceptions of students towards a selection of transversal skills considered relevant for the learning and future careers in health professions across four study programs: medicine in English, medicine in Croatian, dental medicine, and pharmacy at the University of Split School of Medicine (USSM).

The majority of the students (almost 70%) reported a GPA between 3,5 – 4,4. The lowest GPA was mostly among first year students of all study programs, and the highest was reported in general by the final year students. The highest reported GPA was among the fifth-year students of medicine in Croatian, medicine in English and dental medicine. Of the pharmacy program, students of the third year reported the highest GPA.

Only 4 students (1.8%) declared a GPA of 2 – 2.4; all enrolled in first year of medicine in Croatian.

There was a significant difference between GPAs of students of different study programs. 88% of the students from dental program reported a GPA of 3.5 or above, compared to the 83.8% of pharmacy students; 77.6% of medicine in Croatian students; and 66% of medicine in English students.

This can perhaps be explained by the differing curriculums to an extent, and with the added difficulties for the students of medicine in English program in which the majority of students do not have English as their native language.

In addition, studies have shown that local medical students outperform international ones in most countries. In the study investigating the influence of language family on academic performance in Year 1 and 2 MBBS students it was concluded that the cause may be not only due to language proficiency skills, but also due to the difficulty of adopting, aqcuiring and adjusting to a new cultural environment (34).

A small minority of respondents (17.6%) declared to have participated in extracurricular research activities during their medical education. This is slightly less than what a previous cross-sectional study have found (33).

However, it should be noted that the medical students participating in the study will not be completely unexperienced when it comes to research, especially the higher years, despite no extracurricular experience. This because research subjects are integrated into the academic curriculum already from the first study year. In addition, the extent of extracurricular research experience is not considered in this study.

As transversal skills are per definition transferable across jobs, academic disciplines and areas of knowledge, paid work experience is an important aspect to consider when evaluating attitudes and self-perceived abilities to execute transversal skills.

Almost 70% of students declared having paid work experience. Majority being students of senior years. Students of medicine in Croatian had the highest ratio of respondents with paid work experience (79.1%) meanwhile pharmacy students reported the lowest (almost 57%).

However, the pharmacy program consists of 5 study years as opposed to the other programs, which is a relevant bias to observe when comparing between the programs. When comparing study years 4 to 5 from other study programs with the result from senior years of pharmacy program, the difference between dental and pharmacy students is much smaller (61.5% and 64.7% respectively). Also, due to the small sample size of this study, the ratio will be significantly lowered with as few as 2 – 3 students denying paid work experience.

40 (18.1%) students stated that they were familiar with the term transversal skills. The most familiar with this term were medical studies in English students (24%), compared to the dental medicine and medicine in Croatian that were the least familiar (14.9%).

The participation in research activities was associated with an increasing likelihood of familiarity with the term transversal skills. These students reported an almost 3-fold increase in probability of familiarity with the term.

This result could be explained by students studying medicine and/or conducting research in English have a bigger likelihood to be exposed to English terminology and global concepts.

When the study participants were asked to indicate the personal importance of the presented skills in communication, research, self-organization/learning and empathy almost all students, regardless of program and year, reported the perception that all the presented transversal skills are of high personal importance. This is consistent with the overall attitudes found in participants of a study evaluating students enrolled in the master's degree Course in Medicine of FMUP, Portugal (33).

When evaluating the personal importance of communication skills; oral communication was considered personally important by all the students of the senior years (fourth to sixth year), compared to 94.2% of the lower years (first to third year).

The personal importance of written communication is also more visible among senior year students (97% – 100%, compared to 90% – 95%).

This is probably due to the progression of the medical education and increased practical experience.

Regarding written communication skills, a decrease in odds of a good performance was observed in students who participated in research activities. Compared to the students without research experience, they reported a lower personal importance (92.3% compared to 96.7%), ability to execute (79.5% compared to 94.5%) and importance for clinical practice (71.8% compared to 86.3%).

Interestingly, these results are in contradiction with previous research. In a similar study performed by *Ribeiro et al*, it was found that their study participants with research experience had 2-fold increased odds of good performance (33).

The personal importance of visual communication skills was associated with an increased odds of having had a paid job. Almost 2-fold increase in odds of personal importance of visual communication skills was observed in the students that had previous work experience, as well as the ability to execute.

The higher perceived personal importance is consistent with the higher perceived ability to execute written communication as motivation is related to the understanding the relevance of skills taught. Certain skills such as communication are better taught implicitly in authentic work environments and contexts, where the student can learn by doing (28).

The students were also asked to indicate their ability to execute the presented transversal skills. Most of the students reported they had sufficient or good ability to execute the following skills: English proficiency (94.6% of students), problem-solving (95.9%) and empathy (97.3%).

It was interesting that students indicated constant self-perceived ability for the execution of problem solving, since it was the same throughout the years (95% – 97%). This confidence could indicate a curriculum that is focused on assignments and tasks, building their problem-solving abilities. It could also be the result of a lack of exposure to problem-based learning (PBL) during the medical education, meaning the students have not had to confront any incompetence. However, as this study evaluated the students' perceived abilities and did not test the actual skills, neither of the conjectures can be confirmed nor denied.

Pharmacy students ranked their self-perceived English proficiency higher than that of the other programs (100% compared to 96% of students of medicine in English; 94% of students of medicine in Croatian and 91% of students of dental medicine). This is likely the result of a response bias due to open interpretation to what English proficiency denotes. It is possible that non-native speakers accustomed to academic English have a different perception than students accustomed to conversational English but with limited experience of it in academics.

In our study a much smaller percentage of students thought they had sufficient or good ability to maneuver information technology (69.7%). This despite reporting a higher personal importance (83.7%) and importance for clinical practice (89.6%).

The students' perception regarding importance, both personal and for clinical practice, of computer literacy are in line with reports published by the European union placing emphasis on the importance to master skills relevant for the digital world today (7).

Our study indicates a low confidence regarding the students' literature searching execution abilities. Only 65.6% of the students reported it as sufficient or good.

Interestingly, the first-year students contradict this trend of the other study years with almost 86% reporting their execution ability as sufficient or good. This can be compared with the results from the other study years that were significantly lower (45% and almost 55% for second and third year; and 36% – 45% for fourth to sixth). This continuous loss of confidence may not reflect actual incompetence; however, the finding is concerning as our study also shows that only 82 – 83% of the students of fifth and sixth year of study believe that literature searching important for clinical practice (opposed to 95% of the first-year students).

Throughout the medical education students are constantly presented with literature and receive guidance from teaching staff. As medical professionals the responsibility to systematically search databases for available and relevant information. This is a crucial skill to master in order to deliver optimal patient care, a message that the teachers must promote and reinforce throughout the university years.

Notably, only 73.3% students indicated to have sufficient or good ability to execute time management/self-organization skill. This finding is in accordance with a similar study performed by *Ribeiro et al.*, where students also were reported to have some time management difficulties (33).

It is also interesting that the students ranked time management/self-organization skills as one of the skills of highest personal importance, yet our results show no improvement throughout the years. This is likely related to the heavy workload medical students typically encounter, which has led to schools implementing policies to reduce the student work hours (35).

An interesting finding was that 71% of first-year students reported time management/self-organization abilities to be sufficient or good, which increased to 80% of fifth-year students, then decreased to 74% of sixth-year students.

The lower confidence in first-year students is probably due to the transition from high school where the education is tightly scheduled and supervised by teachers, to university where they now have to adapt to be in charge of their own obligations.

A possible factor contributing to the detriment of confidence in sixth-year students can be that many students are in the middle of the time-consuming process of starting their careers (or have already started it) while completing their final year, adding significant stress and work-load. A finding supporting this theory is the difference between the reported confidence between Croatian and English program students (dental 63.3% and medicine in Croatian 40% compared to medicine in English almost 89%). This finding could be a result of the non-native study population being less likely to work in Croatia during their studies.

Our study had a number of limitations, particularly those due to the small population sample. Despite approaching all 1200 students enrolled at USSM, the low response rate across all study programs allowed for the potential of response bias.

Significant variances between study program, year of study, and students with different research experience were detected; however, this study was not designed to assess the impact of other individual factors such as variable self-confidence, perspectives, and definitions of what could be considered a sufficient or good execution ability.

Additionally, the results generalizability may be limited due to the inclusion of students of the English medical program that consists of a more heterogenous international students than the other study programs. With this group of students with varied cultural and educational background, additional factors affecting the result are hard to define.

Due to the online format of the questionnaire, enquiries regarding the transversal skills from participants could not be clarified.

Generalizability of the results of this study is also limited as sample sizes within each of the study programs and across study year were not distributed evenly with some having lower power and representation. This was particularly troublesome for 4th year of medicine in English where no students chose to participate.

6. CONCLUSION

The medical students at the University of Split participating in our study report an understanding of the personal and clinical practice importance to acquire and refine transversal skills. This is an indication that the students are motivated to master the presented transversal skills. This motivation can be maintained by continuing to prioritize the clinical relevance of these skills during the medical education at University of Split, despite their general applicability (28).

Overall, the vast majority of the respondents reported a sufficient or good self-perceived execution ability when it comes to communication skills, empathy and organizational/learning skills with the exception of time-management/self-organization.

More than one fourth of the students perceived their time-management/self-organization skills as insufficient or poor despite the fact that nearly all of students reported this skill as important or very important, both personally and for clinical practice.

As health care professionals, especially true for physicians, time-management is considered a crucial skill to reduce stress and increase productivity However, our study indicates that the University of Split School of Medicine, just like many other educational institutions, have room for improvement and should continue to strive to better prepare students for a career with high unpredictability, irregular schedules or duties, combined with emotional and physical fatigue (23).

By introducing more general skills into the education, as opposed to the current focus on job-specific knowledge and skills, students may learn how to maneuver individual time allocation and task prioritization – two skills that are important to develop to attain professional adeptness (23).

With the exception of English proficiency (almost all), a much smaller majority reported a good or sufficient self-perceived execution ability concerning research skills. Around half of the responders were confident about their data analysis skills and just above two thirds of the responders reported good or sufficient self-perceived literature searching execution ability. The students reported being slightly more confident about their information technology execution abilities (almost seventy percent), and due the importance of digital literacy in the globalized world today this is a concerning finding.

Skills such as literature searching and information technology can be taught implicitly by introducing more problem-based teaching into the curriculum. However, data analysis is one of the skills that is better taught explicitly in the research subjects already present in the curriculum at University of Split School of Medicine (28).

As our study indicate possible inadequacy, further research testing objective execution abilities and surveying students is recommended before possibly revising the current research teaching.

These findings highlight the need for complementing the traditional education of healthcare professionals by introducing more authentic learning environments and possibly update the research course syllabus. Further research is required to assess the utility of such an education model and its ability to create a lasting impact on future clinical practice.

7. REFERENCES

1. European comission. The European Pillar of Social Rights in 20 principles; 2018. p. 11.
2. Council of the European. Council Recommendation of 22 May 2018 on key competences for lifelong learning (Text with EEA relevance). Official Journal of the European Union. 2018;C189/01:1-13.
3. OECD. The Future of Education and Skills Education 2030. OECD publishing; 2019. p. 3-6.
4. Frey A, Ruppert J. Diagnosis of Transferable Competences of Young People in the Dual Vocational Education — A German Perspective. Psychology;8:1546-1569.
5. Chisholm L. Bridges for Recognition Cheat Sheet. Proceedings of the SALTO Bridges for Recognition: Promoting Recognition of Youth Work across Europe. Leuven-Louvain; 2005.
6. Rychen, D S. Key competencies for all: an overarching conceptual frame of reference. In: Rychen D S, Tiana A, editors. Developing Key Competencies in Education: Some lessons from International and National Experience. Paris: UNESCO / International Bureau of Education; 2004. p.5–34.
7. Caena F. Developing a European Framework for the Personal, Social and Learning to Learn Key Competence. Punie Y, editor. JRC Tech. reports. Luxembourg: Publications Office of the European Union; 2019.
8. Abuzour AS, Lewis PJ, Tully MP. Practice makes perfect: A systematic review of the expertise development of pharmacist and nurse independent prescribers in the United Kingdom. Res Social Adm Pharm. 2018 Jan;14(1):6-17.
9. oecd.org [Internet]. Paris: Attitudes and Values for 2030. OECD Future of Education and Skills 2030: Conceptual learning framework; c2018. [updated 2021 April 25; cited 2021 July 5]: Available from: http://www.oecd.org/.
10. ibe.unesco.org [Internet]. Geneva: Glossary of Curriculum Terminology; c2013-09. [updated 2021 Sep 2; cited 2021 Sep 2]. Available from: http://www.ibe.unesco.org/
11. UNESCO Bangkok Office. 2014 Regional Study on Transversal Competencies in Education Policy and Practice (Phase II) School and Teaching Practices for Twenty-first Century Challenges: Lessons from the Asia-Pacific Region. Paris: United Nations Educational, Scientific and Cultural Organization; 2016.
12. Docan-Morgan T, Nelson L. The Benefits and Necessity of Public Speaking Education. In: Vaidya K, (editor). Public speaking for the curious: Why study public speaking. Canberra: The Curious Academic Publishing; 2015. p.1-16.

13. Grewal A, Kataria H, Dhawan I. Literature search for research planning and identification of research problem. Indian J Anaesth. 2016;60(9):635-9.
14. literacy.ala.org [Internet]. Chicago: American Library Association; c2017-01 [updated 2021 sep 2; cited 2021 sep 2]. Available from: https://literacy.ala.org/digital-literacy/.
15. D'Zurilla T J, Goldfried M R. Problem solving and behavior modification. J. Abnorm. Psychol. 1971;78(1):107-26.
16. Yildirim JG, Calt AC, Ardahan M. Problem-solving skills of University nursing students and factors affecting them: A Cross-sectional study. J Pak Med Assoc. 2019;69(11):1717-20.
17. Rausch N, Harendza S. Successful completion of clinical electives - Identification of significant factors of influence on self-organized learning during clinical electives with student focus groups. GMS J Med Educ. 2018;35(3):Doc39.
18. Hautamäki J, Arinen P, Niemivirta MJ, Eronen S, Hautamäki A, Kupiainen S et al. Assessing Learning-to-Learn: A framework. Helsinki: Opetushallitus; 2002.
19. Hoskins B, Fredriksson U. Learning to Learn: What is it and Can it Be Measured. Luxembourg: OPOCE; 2008.
20. Hoffman ML. Empathy and Moral Development: Implications for Caring and Justice. Cambridge: Cambridge University Press; 2000.
21. Hojat M, DeSantis J, Shannon SC, Mortensen LH, Speicher MR, Bragan L, LaNoue M, Calabrese LH. The Jefferson Scale of Empathy: a nationwide study of measurement properties, underlying components, latent variable structure, and national norms in medical students. Adv Health Sci Educ Theory Pract. 2018;23(5):899-920.
22. Rosen MA, DiazGranados D, Dietz AS, Benishek LE, Thompson D, Pronovost PJ, et al. Teamwork in healthcare: Key discoveries enabling safer, high-quality care. Am Psychol. 2018;73(4):433-450.
23. Pitre C, Pettit K, Ladd L, Chisholm C, Welch JL. Physician Time Management. MedEdPORTAL. 2018;14:10681.
24. Eurydice. Key competencies: A developing concept in general compulsory education. Brussels: Eurydice; 2002.
25. Mercer SW, Reynolds WJ. Empathy and quality of care. Br J Gen Pract. 2002;52Suppl:9-12.

26. Craşovan M. Transversal competences or how to learn differently. In: Micle M, Claudiu M, editors. Communication Today: An Overview from Online Journalism to Applied Philosophy. Budapest: Trivent publishing; 2016. p. 171-8.
27. Sá MJ, Serpa S. Transversal Competences: Their Importance and Learning Processes by Higher Education Students. Educ. Sci. 2018;8(3):126.
28. Watson H, Burr S. Twelve tips for teaching twelve transferable skills, MedEdPublish. 2018;7:1-9.
29. Kolodner JL, Camp PJ, Crismond D, Fasse B, Gray J, Holbrook J, et al. Problem-Based Learning Meets Case-Based Reasoning in the Middle-School Science Classroom: Putting Learning by DesignTM Into Practice. J. Learn. Sci. 2003;12(4):495–547.
30. OECD.org [Internet]. Programme for International Student assessment; c2019-12 [updated 2021 May 19, cited 2021 Jul 12]. Available from: https://www.oecd.org/pisa/pisafaq/.
31. Zee M, de Boer M, Jaarsma AD. Acquiring evidence-based medicine and research skills in the undergraduate medical curriculum: three different didactical formats compared. Perspect Med Educ. 2014;3(5):357-70.
32. Ratka A. Empathy and the Development of Affective Skills. Am J Pharm Educ. 2018;82(10):7192.
33. Ribeiro L, Severo M, Ferreira MA. Performance of a core of transversal skills: self-perceptions of undergraduate medical students. BMC Med Educ. 2016;16:18.
34. Mann C, Canny B, Lindley J, Rajan R. The influence of language family on academic performance in Year 1 and 2 MBBS students. Med Educ. 2010;44(8):786-94.
35. Friedman E, Karani R, Fallar R. Regulation of medical student work hours: a national survey of deans. Acad Med. 2011;86(1):30-3.

8. SUMMARY

Objectives: The aim of this study were to investigate and compare the self-perception about importance (personally and for clinical practice), and ability to execute transversal skills of students enrolled in the medical faculty.

Materials and Methods: A cross-sectional study was carried out amongst the student population enrolled at University of Split School of Medicine (USSM). An online questionnaire was administered to 1200 students in all study years and programs and was made accessible online between May to June 2021. Data were collected with consent, and participation was voluntary, anonymous, and without compensation.

Results: A total of 221 students participated in this study. The mean age of the participants was 23, with minimum of 18, and maximum being 41.

A majority of students (81 – 100%) rated the investigated skills (communication skills, research skills, organizational/learning skills and empathy) as important or very important, both personally and for clinical practice.

A majority of students (82.4 – 97.3%) reported their self-perceived execution ability of most presented skills as sufficient or good. The skills the students indicated a lower confidence regarding their ability to execute them were literature searching (65.6% of students rated it as sufficient or good); information technologies (69.7%); data analysis (49.3%), and time-management/self-organization (73.3%).

An ongoing trend observed was a higher confidence of first-year students that their peers of upper years (fourth to sixth) regarding self-perceived execution abilities.

A minority (17.7%) of responders reported extracurricular research experience. The participation in research activities was associated with an increasing odds of familiarity with the term transversal skills (almost 3-fold increase).

Conclusion: This study confirmed that a certain portion of students at USSM lack confidence when executing research skills such as literature searching, information technologies and data analysis. Also, the lower self-perceived ability to successfully execute time-management/self-organization should be further addressed to optimize students' professional future in healthcare. Further research is recommended to consider complementing the traditional education of healthcare professionals for research transversal skills.

9. CROATIAN SUMMARY

Naslov: Transverzalne vještine - samopoimanje studenata Medicinskog fakulteta Sveučilišta u Splitu.

Cilj: Cilj ovog istraživanja bio je ispitati percepciju studenata medicine, medicine na Engleskom jeziku, dentalne medicine i farmacije Medicinskog fakulteta Sveučilišta u Splitu o važnosti transverzalnih vještina (na osobnoj razini i za kliničku praksu) i njihovoj sposobnosti za provođenje tih vještina.

Materijali i metode: Provedeno je presječno istraživanje među studentskom populacijom MEFST-a. Online upitnik bio je dostupan za 1200 studenata svih akademskih godina između svibnja i lipnja 2021. godine. Podaci su prikupljeni uz pristanak, a sudjelovanje je bilo dobrovoljno, anonimno i bez naknade.

Rezultati: Ukupno 211 studenta sudjelovalo je u ovom istraživanju. Prosječna dob bila je 23 godine, a studenti su bili u dobi između 18 i 41 godine. Većina studenata (81 – 100%) ocijenila je ispitivane vještine komunikacijske vještine, istraživačke vještine, organizacijske/sposobnosti učenja i empatiju) važnima ili vrlo važnima, osobno i za kliničku praksu. Većina studenata (82.4 – 97.3%) percipira svoje sposobnosti provođenja većine prezentiranih vještina kao dovoljne ili dobre. Vještine za koje su studenti ukazali da imaju manje povjerenja u svoje sposobnosti provođenja su pretraživanje literature (65.6% studenata ocijenilo je kao dovoljno ili dobro); informacijske tehnologije (69.7%); analiza podataka (49.3%) i upravljanje vremenom/samoorganiziranje (73.3%).

Jasno se vidi i trend koji ukazuje na veće povjerenje studenata prve godine u svoje sposobnosti provođenja vještina u odnosu na studente viših godina (4. – 6.).

Manjina (17.7%) ispitanika sudjelovala je u vannastavnim istraživanjima i ima takvo iskustvo. Sudjelovanje u istraživačkim aktivnostima bilo je povezano s većim izgledima za poznavanje terminologije transverzalne vještine (povećanje gotovo 3 puta).

Zaključak: Ovo istraživanje potvrdilo je da jednom dijelu studenata MEFST -a nedostaje samopouzdanje pri izvršavanju istraživačkih vještina, poput pretraživanja literature, informacijskih tehnologija i analize podataka. Također, trebalo bi dalje istražiti percepciju smanjene sposobnosti uspješnog upravljanja vremenom/samoorganiziranjem kako bi se postigla optimalna profesionalna budućnost studenata u zdravstvu. Preporučuje se daljnje istraživanje kako bi se razmotrilo nadopunjavanje tradicionalnog obrazovanja zdravstvenih djelatnika uvođenjem za razvoj istraživačkih vještina.

10. CURRICULUM VITAE

Personal data

Name: Sara Svensson

Citizenship: Swedish

Email: Sarasvensson@mail.com

Education

Medical Degree (MD), University of Split School of Medicine (2015 – expected 2021)

Uppsala universitet Preclinical safety assessment and pharmacovigilance (2020)

Pauli komvux Foundation year in natural sciences (2014)

Procivitas private gymnasium Social sciences and business administration

Work experience

Nurse assistant 2020-08-10 – 2020-09-30, 2021-01-15 – 2021-03-07, 2021-07-30 –
Vaccina, Malmö, Sweden

Nurse assistant 2021-01-25 – 2021-02-28
Scantest, Malmö, Sweden

Nurse assistant 2020-12-21 – 2021-03-07
Werlabs, Malmö, Sweden

Kitchen aid 2019-07-08 – 2019-08-31
Da Aldo, Skanör, Sweden

Shift manager 2016-07-16 – 2016-09-11
Da Aldo, Skanör, Sweden

Barista 2015-02-02 – 2015-06-17
Lilla kafferosteriet, Malmö, Sweden

Waitress 2011-06-13 – 2011-12-04, 2012-11-19 – 2013-05-12
Mooshka, Sunshine beach, Australia

Barista 2012-01-19 – 2012-05-02
Raw Energy, Noosaville, Australia

Dive master/Scuba diving guide 2010-12-06 – 2011-02-20
Hippo divers, Koh Phi Phi, Thailand

Café manager 2009-09-01 – 2010-10-07
Da Aldo, Skanör, Sweden

Barista 2008-03-01 – 2009-08-31
Da Aldo, Skanör, Sweden

Shop assistant 2007-01-15 – 2007-11-15
Stuk manufaktur, Malmö, Sweden

11. SUPPLEMENT

Transversal skills - self-perceptions of students at University of Split School of Medicine

INSTRUCTIONS:

The questionnaire in front of you is a part of a scientific research in which we want to examine how students at University of Split School of Medicine perceive transversal skills.

The questionnaire is completely anonymous. All the information provided in the questionnaire will be used exclusively for scientific purposes, and the identity of the participants will be completely anonymous for both researchers and the public. In this questionnaire, you will not be asked to provide your name and surname at any time. So please answer the questions fairly and openly.

You will need about 5 minutes to complete this questionnaire.

General information:

Please answer the following questions:

1. Age: _____ (Write in)
2. Study program: Medicine / Dental medicine / Pharmacy / Medical studies in English
3. YEARS OF STUDY: 1. / 2. / 3. / 4. / 5. / 6.
4. Your average grade (GPA or *Grade Point Average*) is:
   between 2.0-2.4 / 2.5-3.4 / 3.5-4.4. / 4.5-5.00
5. Have you participated in any research activities during your study years? yes / no
6. Have you had a paid job (work experience)? Yes / No
7. Are you familiar with the term transversal skills? yes / no

TRANSVERSAL SKILLS

During your education, we acquire two types of skills.

Hard skills are related to specific technical knowledge and abilities that we need in order to perform our job duties effectively.

Transversal skills are soft skills, that include personal qualities, skills and attitudes, that help us really thrive in the workplace.

They have to be complemented with hard skills.

Below is a selected group of transversal skills being investigated in this research.

Please indicate the personal importance (for you) of the presented skills

(1 = Unimportant, 2 = Not very important, 3 = Important, 4=Very important)

Communication skills (CS)

Writing communication	1	2	3	4
Oral communication	1	2	3	4
Visual communication	1	2	3	4

Research skills (RS)

Literature searching	1	2	3	4
Information technologies	1	2	3	4
Data analysis	1	2	3	4
English proficiency	1	2	3	4

Organizational/ learning skills

Team-work	1	2	3	4
Problem-solving	1	2	3	4
Time management/ self-organization	1	2	3	4
Improving your learning (learning to learn)	1	2	3	4

Empathy

Empathy	1	2	3	4

Below is a selected group of transversal skills being investigated in this research.
Please indicate your ability to execute it (1 = Poor, 2 = Insufficient, 3 = Sufficient, 4 = Good)

Communication skills (CS)

Writing communication	1	2	3	4
Oral communication	1	2	3	4
Visual communication	1	2	3	4

Research skills (RS)

Literature searching	1	2	3	4
Information technologies	1	2	3	4
Data analysis	1	2	3	4
English proficiency	1	2	3	4

Organizational/ learning skills

Team-work	1	2	3	4
Problem-solving	1	2	3	4
Time management/ self-organization	1	2	3	4
Improving your learning (learning to learn)	1	2	3	4

Empathy

Empathy	1	2	3	4

Below is a selected group of transversal skills being investigated in this research.
Please indicate the importance of the presented skills <u>for clinical practice.</u>
(1 = Unimportant, 2 = Not very important, 3 = Important, 4=Very important)

Communication skills (CS)

Writing communication	1	2	3	4
Oral communication	1	2	3	4
Visual communication	1	2	3	4

Research skills (RS)

Literature searching	1	2	3	4
Information technologies	1	2	3	4
Data analysis	1	2	3	4
English proficiency	1	2	3	4

Organizational/ learning skills

Team-work	1	2	3	4
Problem-solving	1	2	3	4
Time management/ self-organization	1	2	3	4
Improving your learning (learning to learn)	1	2	3	4

Empathy

Empathy	1	2	3	4