

# Assessment of year-level competencies and their relationship to program outcomes in Bachelor of Science in Physical Therapy

## RESEARCH ARTICLE

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ORCID: 0000-0002-5172-5066**Abstract**

Although competency-based education emphasizes the progressive development of cognitive, affective, and psychomotor competencies, institution-specific evidence examining their relationships with internship performance in physical therapy education remains limited. Examining these relationships may provide useful evidence for strengthening students' preparation for clinical practice. This study examined the cognitive, affective, and psychomotor competency indicators of Bachelor of Science in Physical Therapy (BSPT) students across the first-, second-, and third-year levels and their relationships with internship program outcomes. A descriptive-correlational design was used to analyze archival academic and internship evaluation records from Academic Years 2021–2022 to 2023–2024. Year-level competency indicators were derived from grades in selected courses, while internship outcomes were based on Clinical Instructor evaluations. Spearman's rank-order correlation was used to examine the relationships between competency indicators and internship outcomes. Second-year students obtained the highest competency ratings across all three domains, while internship assessments showed relative strengths in professional behavior and attendance and comparatively lower ratings in theoretical and oral performance. Significant associations varied by year level: first-year competency indicators were positively associated with theoretical performance, second-year cognitive and psychomotor indicators showed inverse associations with practical performance, and third-year indicators across all three domains were positively associated with clinical skills. The findings demonstrate that competency patterns and their relationships with internship outcomes vary across stages of the BSPT program. These results provide institution-specific evidence for identifying competency areas and year levels that warrant continued monitoring and targeted educational support, particularly as students progress toward clinical practice.

**Keywords:** Physical Therapy education, competency-based learning, program outcomes, cognitive, affective and psychomotor domains, internship performance

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**INTRODUCTION**

One of the central challenges in higher education is preparing students with competencies that can be applied to complex academic and professional contexts. Employers increasingly emphasize applied skills such as problem-solving, critical thinking, communication, collaboration, and self-management (Gosselin, 2020). Consequently, higher education institutions are

encouraged to modernize teaching, learning, and assessment practices to develop transferable competencies relevant to professional practice (European Union, 2017; Roegiers, 2016).

This emphasis on competency development is also reflected in Philippine higher education policy. Commission on Higher Education (CHED)

Memorandum Order No. 46, s. 2012 provides a broader policy framework for outcomes-based higher education, emphasizing quality assurance and competency-based learning standards. For physical therapy education, these expectations are further specified in CHED Memorandum Order No. 55, s. 2017, which provides the Policies, Standards and Guidelines for the Bachelor of Science in Physical Therapy program. Together, these policies establish a national context for developing and assessing competencies that are relevant to professional practice.

Within this context, competency-based education (CBE) provides a framework for translating educational expectations into teaching, learning, and assessment practices. Rather than focusing solely on time spent in instruction, CBE emphasizes the progressive development and demonstration of knowledge, skills, and professional attributes required for practice (Timmerberg et al., 2022). Competencies are developed through classroom instruction, collaborative activities, and practical experiences, while assessment provides evidence of competency development and areas requiring further support (Hooper & Sullivan, 2014; Glory & Habeeb, 2020; Zlatkin-Troitschanskaia et al., 2017).

This perspective is particularly relevant to physical therapy education, where professional competence requires the integration of theoretical knowledge, clinical reasoning, technical skills, communication, and professional behavior. Physiotherapy education combines academic coursework with clinical experiences in which students apply knowledge and demonstrate cognitive, psychomotor, and interpersonal competencies in patient care (Reubenson et al., 2020). Thus, assessment across stages of the curriculum may provide useful evidence of students' preparation for clinical education.

Academic achievement and clinical performance represent related but distinct aspects of professional preparation. Students may perform satisfactorily in academic courses while requiring further development in applying knowledge, technical skills, communication, or professional behaviors in clinical settings. Examining year-level competencies and their relationship with internship outcomes may therefore

provide evidence regarding alignment between academic preparation and clinical performance. Institution-specific evidence on these relationships remains limited, particularly regarding whether competencies developed at different stages of a BSPT program are associated with specific internship outcomes.

## Literature Review

### Competency-Based Education in Physical Therapy

Competency-based education (CBE) emphasizes the progressive development and demonstration of knowledge, skills, and professional attributes required for practice. Unlike approaches that focus primarily on time spent in instruction, CBE emphasizes demonstrated mastery of specified competencies and requires assessment practices that provide evidence of learners' progression (Timmerberg et al., 2022). Competencies are developed through classroom instruction, collaborative activities, and practical experiences and are intended to be specific, measurable, and transferable to professional contexts (Hooper & Sullivan, 2014). Assessment is therefore central to CBE because it can identify learners' developmental needs and provide evidence of achievement (Glory & Habeeb, 2020).

In professional education, competencies should be distinguished from program outcomes. Competencies represent the knowledge, skills, attitudes, and abilities that students progressively develop, whereas program outcomes describe what students are expected to know or demonstrate upon completion of an academic program (Kennedy & McCarthy, 2016; University of Nevada, 2023). Examining competencies at different stages of a program can therefore provide evidence of students' progression toward broader program outcomes.

This distinction is particularly relevant to physical therapy education. Physiotherapy training combines academic coursework with clinical experiences that require students to integrate theoretical knowledge, clinical reasoning, technical skills, and interpersonal abilities (Reubenson et al., 2020). Competency-based education is consequently applicable to physical therapy because professional preparation requires students to progressively demonstrate competencies associated

with professional practice (Timmerberg et al., 2022). Assessment across year levels may thus provide useful information regarding whether students are developing the competencies expected before they assume more complex clinical responsibilities.

### **Cognitive, Affective, and Psychomotor Competencies**

A multidimensional approach to competency assessment is appropriate for physical therapy because professional performance requires more than theoretical knowledge. Bloom's taxonomy provides a framework for classifying learning into cognitive, affective, and psychomotor domains (Bloom, 1956). The cognitive domain concerns knowledge and intellectual processes; the affective domain encompasses attitudes, values, motivation, and behavioral dispositions; and the psychomotor domain involves physical and technical performance (Cheng, 2023; Engin et al., 2024).

These domains are conceptually distinct but interrelated. Kuboja and Ngussa (2015) emphasized the importance of considering cognitive and affective development together, while Sönmez (2017) highlighted the interconnectedness of different dimensions of learning. Khidzir et al. (2016) similarly reported relationships among cognitive, affective, and psychomotor learning. A comprehensive assessment of competency should therefore consider these domains collectively rather than treating academic knowledge, professional attitudes, and technical performance as completely independent aspects of learning.

This multidimensional perspective is particularly relevant in physical therapy. Cognitive competency supports clinical reasoning and application of theoretical knowledge; psychomotor competency supports the performance of therapeutic procedures and other technical skills; and affective competency supports professional behavior, communication, responsibility, and appropriate interaction with patients and colleagues. Reubenson et al. (2020) similarly emphasized that physiotherapy students must integrate cognitive, physical, and interpersonal competencies when applying theory and skills in clinical settings.

### **Clinical Education and Internship Outcomes**

Clinical education provides an important context for

observing how students apply competencies developed through academic coursework. Physical therapy students are expected to transfer theoretical knowledge and practical skills to patient care while demonstrating professional behavior and effective communication. Consequently, clinical performance represents a broader form of competency assessment than academic achievement alone.

The relationship between academic competency and clinical performance, however, should not be assumed to be direct. Academic grades primarily reflect achievement of course-specific learning outcomes, whereas clinical evaluations may incorporate technical performance, professional behavior, attendance, theoretical knowledge, practical performance, and communication. The present study therefore treats academic performance in selected courses as indicators of year-level competency, while clinical instructor evaluations represent internship program outcomes. This distinction allows the study to examine whether competency indicators at different stages of the curriculum are associated with specific dimensions of internship performance.

Assessment of competencies across year levels is also relevant to curriculum progression. Students are expected to develop foundational knowledge and skills before advancing to more complex professional and clinical responsibilities. The BSPT curriculum includes lecture and laboratory courses intended to develop knowledge and practical skills before students undertake internship experiences.

Thus, examining competencies at the first-, second-, and third-year levels can provide evidence regarding students' developmental patterns and their relationship to subsequent internship performance. Such evidence may also identify areas in which academic or clinical preparation requires strengthening and help address the limited institution-specific evidence on relationships between year-level competency indicators and internship outcomes.

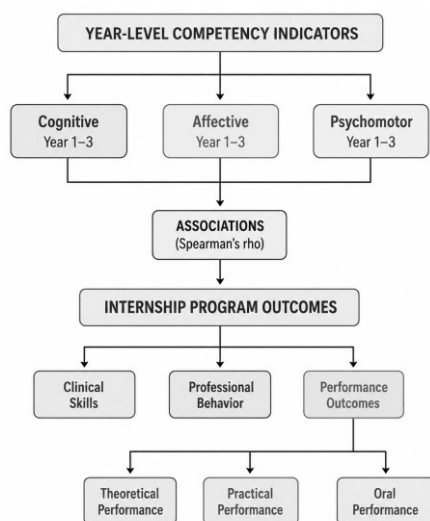
### **Conceptual Framework**

The conceptual framework of the study is based on competency-based education and the multidimensional view of learning represented by the cognitive, affective,

and psychomotor domains. The framework distinguishes year-level competency indicators from internship program outcomes. Year-level competency indicators are derived from academic performance in selected courses classified according to their dominant learning objectives, while internship program outcomes are represented by clinical instructors' evaluations of interns' performance.

The framework proposes that competency indicators at different stages of the BSPT curriculum may be associated with different dimensions of internship performance. The study therefore examines the relationships between cognitive, affective, and psychomotor competency indicators at the first-, second-, and third-year levels and internship outcomes. The framework does not assume causality; relationships are examined statistically using correlational analysis.

Figure 1. Conceptual Model of the Relationship Between Year-Level Competency Indicators and Internship Program Outcomes



### Significance of the Study

Assessing competencies across year levels provides several advantages. First, it allows educators to monitor progression, ensuring that foundational skills are firmly established before students advance to more complex content. Second, it identifies areas where students struggle, enabling targeted interventions. Third, it promotes holistic assessment across cognitive, affective, and psychomotor domains, ensuring graduates are well-rounded in knowledge, attitudes, and

technical abilities. Finally, linking competencies to program outcomes provides empirical evidence of curriculum effectiveness and highlights which skills most strongly predict professional readiness. By establishing these relationships, programs can prioritize critical competencies, allocate resources strategically, and design interventions that strengthen weaker domains. Such alignment ensures that physical therapy education not only meets academic standards but also prepares students for the realities of clinical practice.

### Objectives of the Study

This study investigated the competencies of Bachelor of Science in Physical Therapy (BSPT) interns at the University of Baguio across different year levels and domains. Specifically, it aimed to:

1. Determine the competency levels of BSPT interns in their first, second, and third years in the following domains: a. Cognitive, b. Affective, and c. Psychomotor
2. Assess interns' competencies as evaluated by clinical instructors in terms of Skills, Attitude and behavior, Attendance and punctuality, and Overall competency
3. Examine the relationships among cognitive, affective, and psychomotor competencies and overall program outcomes.

## METHODOLOGY

### Research Design

This study employed a nonexperimental, descriptive-correlational design using archival academic and internship evaluation records. The descriptive component characterized students' year-level competencies across the cognitive, affective, and psychomotor domains and interns' performance during internship. The correlational component examined the strength and direction of associations between year-level competency indicators and internship program outcomes. No variables were manipulated by the researchers. Spearman's rank-order correlation was used to examine the relationships.

### Locale of the Study

The study was conducted at the University of Baguio's School of Natural Sciences (SNS). Data were drawn from the SNS Dean's Office and the Physical Therapy Center, covering 103 students who completed

internships during Academic Years 2021–2022 to 2023–2024. The same students' academic records across the first, second, and third years were linked to their internship evaluation records; thus, year-level measures represent repeated observations of students rather than independent samples at each year level.

### Data Gathering Tools

Students' grades in selected BSPT courses served as indicators of year-level competency. Grades were used as indicators because they provide evidence of students' attainment of curriculum-based knowledge and skills; studies by Kim (2022) and Schwab et al. (2018) likewise reported relationships between academic competency and grades. Only grades from the students' first take of each course were used. For students who failed on the first take, a grade of 70 was recorded, consistent with the university's reported failing final grade.

The courses were classified according to their dominant learning objectives and instructional components, rather than assuming that each course addressed only one learning domain. A course may, in practice, develop cognitive, affective, and psychomotor outcomes simultaneously; however, for purposes of this study, courses were grouped according to the domain(s) most strongly reflected in their instructional design and assessment activities. This approach was guided by Bloom's taxonomy of learning domains. Lecture-oriented courses primarily emphasized cognitive learning through knowledge acquisition, comprehension, application, analysis, and evaluation (Shaikh et al., 2021; Mohammed & Omar, 2020). Laboratory-based courses incorporated cognitive learning through the application of concepts and psychomotor learning through procedural and technical practice (Bezerra, 2022). Courses combining lecture and laboratory components were treated as addressing all three domains because their activities integrated theoretical knowledge, practical performance, and affective outcomes such as teamwork, responsibility, and professional attitudes (Bezerra, 2022).

The attainment of internship program outcomes was determined from Clinical Instructor (CI) ratings of students who completed their internships during Academic Years 2021–2022 to 2023–2024. The CIs

used the Competency Assessment for BS Physical Therapy Interns, developed by the School of Natural Sciences and implemented at the Physical Therapy Center since 2021–2022. The instrument had been validated through the Research Innovation Extension and Community Outreach Office before its implementation and had been in use since 2021. Internal consistency reliability was not re-evaluated for the present study because the instrument was an established and previously validated assessment tool used in the clinical setting.

The competency assessment covered six components: Skills (40%), Attitude and Behavior (10%), Attendance and Punctuality (5%), Theoretical Performance (15%), Practical Performance (20%), and Oral Performance (10%).

### Data Gathering Procedures

With approval from the SNS Dean's Office, the researchers obtained students' academic records for first through third year and internship evaluation results from the Physical Therapy Center. Grades were extracted from e-class records, while clinical instructor assessments were compiled from internship files. All records were coded to maintain student anonymity.

### Treatment of Data

Year-level competencies were computed as averages of course grades, then described using the standard university grading scale: 97–100 (Excellent); 91–96 (Very Good); 85–90 (Good); 80–84 (Satisfactory); 75–79 (Fair); 74 and below (Failed). Intern competencies were assessed using the SNS Competency Assessment tool, which employed a four-point Likert scale ranging from Needs Improvement to Very Satisfactory. The Shapiro–Wilk test indicated that the data were not normally distributed ( $p < .001$ ); therefore, Spearman's rank-order correlation coefficient ( $\rho$ ), a nonparametric measure, was selected to examine the relationships between year-level competencies and program outcome attainment. All analyses were conducted using SPSS, with statistical significance set at the 5% level ( $\alpha = .05$ ).

### Ethical Considerations

The study adhered to ethical standards under Republic Act No. 10173 (*Data Privacy Act of 2012*). Although students' names were initially accessed in records, data

were anonymized through coding and were not reported in the study. Only final grades and evaluation scores were analyzed, and all documents were treated with strict confidentiality throughout data collection and analysis.

## RESULTS AND DISCUSSION

### Cognitive Domain

Cognitive competency varied across year levels, with the mean increasing from 79.8 (*Fair*) in the first year to 80.8 (*Satisfactory*) in the second year, before declining to 78.1 (*Fair*) in the third year. This pattern is consistent with literature showing that competency development among health-profession trainees may follow variable rather than uniformly progressive trajectories (Deane et al., 2018). The second-year result is also consistent with evidence highlighting the importance of experiential and applied learning in developing clinical reasoning and decision-making (Tariq et al., 2021; Van Veld et al., 2018). However, the third-year decline indicates that cognitive competency did not increase progressively across the three year levels. Although differences in curricular and clinical contexts have been discussed in previous research (Miura et al., 2019), the present study did not measure such factors; therefore, the reasons for the observed variation cannot be established.

### Affective Domain

Affective competency followed a similar pattern, increasing from *Fair* in the first year (79.3) to *Satisfactory* in the second year (80.5), before declining to *Fair* in the third year (78.1). The second-year improvement may be consistent with the role of reflective learning in strengthening interpersonal and communication skills (Khalil & Hashish, 2022). However, the subsequent decline suggests that affective development may not progress linearly. Singh et al. (2024) likewise reported variability in emotional maturity among medical interns, despite generally favorable competency levels. The finding highlights the need for continued support for affective competency throughout clinical education.

### Psychomotor Domain

Psychomotor competency followed a similar pattern, increasing from *Fair* in the first year (79.3) to *Satisfactory* in the second year (80.8), before declining to *Fair* in the third year (77.8). The second-

year improvement is consistent with evidence that hands-on and experiential learning can support the development of procedural skills (Alrazeeni et al., 2021). However, the third-year decline indicates that psychomotor competency did not increase progressively across the three year levels. Similar variability in competency development has been reported among health-professions trainees, including physical therapy interns (Tariq et al., 2021) and clinical psychology trainees (Deane et al., 2018). The findings therefore suggest the importance of monitoring psychomotor competency across successive stages of professional education and providing continued opportunities for skill development and reinforcement.

### Competency Levels of Interns as Assessed by Clinical Instructors

#### Interns' Skills

Table 1 summarizes the skills of BSPT interns across program outcomes as rated by clinical instructors. The overall mean score of 2.72 (*S*) indicates that interns generally demonstrated satisfactory competency, with performance that was often observable and required minimal guidance. The highest-rated competency was the ability to operate instruments, computers, and laboratory software ( $M=3.21$ , *S*). This finding is consistent with the emphasis on technical proficiency in laboratory-based and simulation learning experiences. Interns also scored well in utilizing health outcome measures to screen patient status ( $M=2.96$ , *S*) and in selecting reliable outcome measures ( $M=2.85$ , *S*). These results indicate satisfactory performance in the use and selection of outcome measures, which are relevant to evidence-informed clinical practice (Jain et al., 2022). Educators may therefore continue to integrate technological tools and innovations into physical therapy curricula to support students' preparation for contemporary practice (Atout & Nalubega, 2023).

Despite the overall satisfactory ratings, several areas demonstrated weaker performance. The lowest mean was observed in formulating attainable goals for patients ( $M=2.43$ , *Fair*), followed by formulating time-bound goals ( $M=2.50$ , *Fair*). Interns also scored relatively low in setting measurable ( $M=2.51$ , *S*) and realistic goals ( $M=2.51$ , *S*). These results identify goal setting and treatment planning as areas for further development.

Table 1. *PT Interns' Skills*

| Competency Indicators                                  | M           | SD          | DI       |
|--------------------------------------------------------|-------------|-------------|----------|
| 1. Uses sound clinical reasoning in assessment         | 2.84        | 0.44        | S        |
| 2. Uses sound clinical reasoning in prognosis          | 2.77        | 0.51        | S        |
| 3. Selects relevant outcome measures                   | 2.83        | 0.49        | S        |
| 4. Selects reliable outcome measures                   | 2.85        | 0.53        | S        |
| 5. Effectively uses relevant outcome measures          | 2.96        | 0.42        | S        |
| 6. Effectively uses reliable outcome measures          | 2.83        | 0.55        | S        |
| 7. Operates instruments/computers/software competently | 3.21        | 0.43        | S        |
| 8. Formulates PT diagnosis                             | 2.77        | 0.52        | S        |
| 9. Documents assessment results accurately             | 2.71        | 0.47        | S        |
| 10. Communicates assessment results effectively        | 2.83        | 0.44        | S        |
| 11. Prioritizes problems for intervention              | 2.78        | 0.50        | S        |
| 12. Uses reasoning in planning interventions           | 2.82        | 0.41        | S        |
| 13. Uses reasoning in implementing interventions       | 2.82        | 0.41        | S        |
| 14. Formulates specific goals                          | 2.54        | 0.61        | S        |
| 15. Formulates measurable goals                        | 2.51        | 0.64        | S        |
| 16. Formulates attainable goals                        | 2.43        | 0.60        | F        |
| 17. Formulates realistic goals                         | 2.51        | 0.61        | S        |
| 18. Formulates time-bound goals                        | 2.50        | 0.62        | S        |
| 19. Selects appropriate interventions                  | 2.59        | 0.53        | S        |
| 20. Selects cost-effective interventions               | 2.63        | 0.52        | S        |
| 21. Implements interventions effectively               | 2.63        | 0.51        | S        |
| 22. Documents intervention results accurately          | 2.51        | 0.50        | S        |
| <b>Over-all Mean</b>                                   | <b>2.72</b> | <b>0.31</b> | <b>S</b> |

*Interpretation: 1.00-1.75 – Needs Improvement (NI); 1.76-2.50 – Fair (F); 2.51-3.25 – Satisfactory (S); 3.26-4.00 – Excellent (E)*

Documentation skills also emerged as an area for improvement, with relatively low ratings in recording intervention results according to accepted standards ( $M=2.51, S$ ) and comprehensively documenting assessment findings ( $M=2.71, S$ ). Since documentation plays an important role in continuity of care, legal accountability, and interprofessional communication, these findings suggest an area for curricular reinforcement. This pattern is consistent with previous studies reporting that physical therapy students may perform well in practical tasks while experiencing greater challenges in clinical reasoning, treatment planning, and documentation (Kalu et al., 2020; Field et al., 2023). These aspects require higher-order integration of knowledge, problem-solving, and communication and are important components of clinical practice.

The findings may be considered in relation to the curriculum's emphasis on technical and applied learning. The stronger performance in tool usage and outcome-based assessments is consistent with the practical components of physical therapy training, whereas the comparatively lower ratings in treatment planning and documentation identify areas that may warrant further curricular attention. Studies in physical therapy education have similarly identified goal-setting and reflective documentation as areas requiring continued development (Dorsey et al., 2018; Kalu et al., 2020). Early exposure to academic behavior assessment and structured feedback has also been associated with improvements in these competencies (Dorsey et al., 2018). These approaches may therefore be considered in strengthening weaker areas while maintaining students' existing technical competencies.

### Interns' Attitude and Behavior

Table 2 presents the attitudes and behaviors of BSPT interns in terms of professionalism, interpersonal skills, communication, and social responsibility. The overall mean of 3.13 ( $S$ ) indicates that interns generally demonstrated the expected attributes during clinical training, particularly in teamwork, professionalism, and ethical practice.

The highest-rated competency was "Provides equal opportunities to everyone regardless of gender, race, religion, political affiliation, economic status, educational background, and societal position" ( $M=3.69, E$ ). This indicates a strong emphasis on inclusivity and fairness in interns' interactions, which is important in diverse healthcare environments. Similarly, "Shows sensitivity and respect for the beliefs and values of others" scored 3.66 ( $E$ ), indicating sensitivity to cultural differences. The third highest rating was "Demonstrates appropriate behavior as a productive member of the team" ( $M=3.38, E$ ), highlighting effective collaboration. Overall, the findings indicate strengths in respect for diversity, teamwork, and professional behavior, which are important attributes for practice in diverse and interdisciplinary healthcare settings. This is consistent with Marqués-Sulé et al. (2022), who found that professional values are strengthened through education and contribute to students' ethical attitudes.

Table 2. *Interns' Attitude and Behavior Ratings*

| Indicators                                                                                                                      | M           | SD          | DI       |
|---------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|----------|
| 1. Works effectively with peers and multi-disciplinary/multi-cultural teams                                                     | 3.08        | 0.39        | S        |
| 2. Demonstrates good interpersonal skills with patients and co-workers                                                          | 3.05        | 0.51        | S        |
| 3. Practices professionalism                                                                                                    | 3.11        | 0.42        | S        |
| 4. Exhibits ethical behavior                                                                                                    | 3.07        | 0.40        | S        |
| 5. Applies customer and personal service concepts in PT delivery                                                                | 3.02        | 0.40        | S        |
| 6. Applies public safety and security concepts in PT delivery                                                                   | 3.03        | 0.22        | S        |
| 7. Practices data security and patient confidentiality                                                                          | 3.02        | 0.28        | S        |
| 8. Communicates effectively through verbal form                                                                                 | 2.85        | 0.51        | S        |
| 9. Communicates effectively through non-verbal form                                                                             | 2.82        | 0.51        | S        |
| 10. Communicates effectively through written form                                                                               | 2.97        | 0.60        | S        |
| 11. Demonstrates appropriate behavior as a productive team member                                                               | 3.38        | 0.60        | E        |
| 12. Shows sensitivity and respect for others' beliefs and values                                                                | 3.66        | 0.48        | E        |
| 13. Provides equal opportunities regardless of gender, race, religion, politics, economic status, education, or social position | 3.69        | 0.46        | E        |
| <b>Over-all Mean</b>                                                                                                            | <b>3.13</b> | <b>0.24</b> | <b>S</b> |

Interpretation: 1.00-1.75 – Needs Improvement (NI); 1.76-2.50 – Fair (F); 2.51-3.25 – Satisfactory (S); 3.26-4.00 – Excellent (E)

The lowest ratings were observed in communication skills. Non-verbal communication was rated at 2.82 (S), verbal communication at 2.85 (S), and written communication at 2.97 (S). Although all remained within the satisfactory range, these results identify communication as a comparatively weaker area. Communication is central to patient care and interprofessional collaboration, and its continued development is important in clinical education. Similar findings have been reported elsewhere, with physical therapy students generally demonstrating competence in ethical behavior and professionalism while communication remains an area for further development (Cook et al., 2018; Donaldson et al., 2022).

The findings therefore show a relative strength in inclusivity, professionalism, and teamwork, alongside comparatively lower ratings in communication. Although the present study did not examine the factors underlying these differences, targeted communication training may provide opportunities to further develop this competency. Cannity et al. (2020) found that structured communication training can strengthen empathic responses and confidence in clinical settings. Similarly,

Forsey et al. (2021) emphasized that effective communication involves both information exchange and the development of patient engagement and rapport. These approaches may be considered in physical therapy training to further strengthen communication competencies.

### Attendance and Punctuality

The competency of BSPT interns in attendance and punctuality was evaluated based on regularity of attendance, punctuality, and communication regarding absences or tardiness. The overall mean of 3.56 (Excellent) indicates that interns consistently met the expected standards across these indicators. The relatively low standard deviation also suggests limited variation in performance across the group. These results indicate a strength in accountability and professional conduct during clinical internship. Consistent attendance and punctuality are important components of professional practice and may be reinforced throughout clinical education (Alpine et al., 2020; Mamin & Hayes, 2018).

### Interns' Over-all Level of Competency

Table 3 presents the overall competency levels of BSPT interns across skills, attitude and behavior, attendance and punctuality, and theoretical, practical, and oral performance. Each component was assigned a relative weight based on its contribution to the overall competency assessment. The overall mean of 2.67 (Satisfactory) indicates that interns generally met the expected competency level, although performance varied across the assessed components.

The highest ratings were observed in attendance and punctuality and attitude and behavior, while theoretical and oral performance received comparatively lower ratings. This variation indicates that competency was not uniform across the different components of internship assessment. Similar variation has been reported in health-professions education. Tariq et al. (2021) and Kalu et al. (2020) reported generally satisfactory performance in selected areas of patient management and professionalism, whereas Dias et al. (2019) identified areas of knowledge and skill requiring further development. Kalu et al. (2020) likewise identified clinical reasoning, objective assessment, and communication as areas requiring continued

development. The comparatively lower ratings in theoretical and oral performance in the present study therefore identify areas that may warrant continued academic and communication support during clinical training.

Table 3. *Interns' Over-all Level of Competency*

|                                              | Relative Weight | M           | SD          | DI       |
|----------------------------------------------|-----------------|-------------|-------------|----------|
| Interns' Skill                               | 40%             | 2.72        | 0.31        | S        |
| Attitude and Behavior                        | 10%             | 3.13        | 0.24        | S        |
| Attendance and Punctuality                   | 5%              | 3.56        | 0.56        | E        |
| Theoretical assessments                      | 15%             | 2.23        | 0.51        | F        |
| Practical (Quota, Practical exams)           | 20%             | 2.66        | 0.62        | S        |
| Oral (Oral Revalida, Case Presentations)     | 10%             | 2.18        | 0.38        | F        |
| <b>Interns' Over-all Level of Competency</b> |                 | <b>2.67</b> | <b>0.23</b> | <b>S</b> |

*Interpretation: 1.00-1.75 – Needs Improvement (NI); 1.76-2.50 – Fair (F); 2.51-3.25 – Satisfactory (S); 3.26-4.00 – Excellent (E)*

### Correlations between the cognitive, affective, psychomotor skills and the UB PT interns' competencies

Table 4 presents the results of Spearman's rho correlation analysis examining the relationship between year-level competencies in the cognitive (COG), affective (AFF), and psychomotor (PSM) domains and the attainment of program outcomes. Results are reported separately for first, second, and third-year interns.

#### First-Year Data

The first-year analysis showed that most relationships between competency indicators and internship outcomes were not statistically significant. However, theoretical performance demonstrated statistically significant positive associations with the cognitive, affective, and psychomotor domains. The findings indicate that higher competency indicators across all three domains were associated with higher theoretical performance. The association with cognitive competency is consistent with the role of cognitive abilities in academic achievement (Dversdal et al., 2018; Anton et al., 2023), while the relationships involving affective and psychomotor competency suggest that these dimensions may also be relevant to students' academic performance. Similar relationships between affective competency and academic outcomes have been reported in medical education (Aristotle & Ramraj, 2022), while hands-on learning has been

associated with the development and reinforcement of procedural knowledge (Alrazeeni et al., 2021; Harun et al., 2018). Because the present study did not examine the mechanisms underlying these relationships, the findings should be interpreted as associations rather than evidence that one competency domain causes higher theoretical performance.

#### Second-Year Data

In the second-year analysis, most relationships between competency indicators and internship outcomes were not statistically significant. However, practical performance showed a significant inverse association with the cognitive and psychomotor domains. This indicates that higher cognitive and psychomotor competency indicators were associated with slightly lower practical-performance scores in this sample. The finding differs from the expected positive relationship between competency and practical performance and should therefore be interpreted cautiously. Previous literature has shown that cognitive and psychomotor performance may vary according to task characteristics and assessment conditions (Morrone & Pedlar, 2024; Beurskens et al., 2020; Wollesen et al., 2022). However, the present study did not examine neural efficiency, dual-task demands, or assessment characteristics; thus, these factors cannot be established as explanations for the observed inverse associations. The finding may warrant further investigation using direct measures of practical performance and assessment conditions.

#### Third-Year Data

By the third year, most relationships between competency indicators and internship outcomes remained non-significant. However, cognitive, affective, and psychomotor competencies each showed significant positive associations with clinical skills. These findings indicate that higher competency indicators across the three domains tended to coincide with higher clinical-skill ratings among third-year students. The finding is consistent with the multidimensional nature of clinical competency, in which cognitive abilities contribute to clinical reasoning and problem-solving (Priyanto & Inderanata, 2020; Predovic et al., 2021), affective attributes are relevant to professional and interpersonal practice (Yoshida et al., 2022), and psychomotor skills are integral to procedural performance (Reaves et al., 2024). The convergence of

these significant associations in the third year highlights the relevance of multiple competency dimensions to clinical skill performance at this stage of training.

Table 4. *Correlation between year-level competencies in three domains and the competencies of UB PT interns*

| Internship Outcome         | First Year                                    | Second Year                                    | Third Year                                  |
|----------------------------|-----------------------------------------------|------------------------------------------------|---------------------------------------------|
| Interns' Skill             | COG .010;<br>AFF -.025;<br>PSM -.025          | COG .083;<br>AFF .131;<br>PSM .083             | COG .235*;<br>AFF .228*;<br>PSM .199*       |
| Attitude and Behavior      | COG .030;<br>AFF .074;<br>PSM .074            | COG .108;<br>AFF .131;<br>PSM .108             | COG .130;<br>AFF .133;<br>PSM .115          |
| Attendance and Punctuality | COG .002;<br>AFF .051;<br>PSM .051            | COG .134;<br>AFF .093;<br>PSM .134             | COG .021;<br>AFF .017;<br>PSM -.031         |
| Theoretical Assessments    | COG .282**;<br>AFF .284**;<br>PSM .284**      | COG .111;<br>AFF .159;<br>PSM .111             | COG .127;<br>AFF .142;<br>PSM .124          |
| Practical Assessments      | COG -.066;<br>AFF -.081;<br>PSM -.081         | COG -.238*;<br>AFF -.182;<br>PSM -.238*        | COG -.162;<br>AFF -.145;<br>PSM -.109       |
| Oral Assessments           | COG .128;<br>AFF .163;<br>PSM .163            | COG -.002;<br>AFF .053;<br>PSM -.002           | COG .040;<br>AFF .050;<br>PSM .024          |
| <b>Overall Competency</b>  | <b>COG .036;<br/>AFF -.004;<br/>PSM -.004</b> | <b>COG -.080;<br/>AFF -.004;<br/>PSM -.080</b> | <b>COG .064;<br/>AFF .079;<br/>PSM .070</b> |

Note. Values are Spearman's rho ( $\rho$ ). \*  $p < .05$ , \*\*  $p < .01$ , COG – Cognitive Domain, AFF – Affective Domain, PSM – Psychomotor

## Conclusion and Recommendations

This study examined the competency levels of BSPT students across the cognitive, affective, and psychomotor domains and their internship program outcomes. Second-year students obtained the highest competency ratings across all three domains, whereas first- and third-year students obtained comparatively lower ratings, with third-year competency returning to the *Fair* level. These findings identify the third year as a stage warranting particular attention to the continued development and reinforcement of cognitive, affective, and psychomotor competencies. Among internship outcomes, interns demonstrated strengths in professionalism, inclusivity, ethical behavior, and attendance, while theoretical and oral performance received comparatively lower ratings. Correlation analysis showed that first-year cognitive, affective, and psychomotor competency indicators were positively associated with theoretical performance; second-year cognitive competency had a weak inverse association with practical performance; and third-year cognitive, affective, and psychomotor competency indicators were positively associated with clinical skills. These findings

indicate that the associations between year-level competency indicators and internship outcomes varied across year levels and performance domains, highlighting the need for continued competency monitoring and targeted support, particularly in areas showing comparatively lower performance.

The study was limited by reliance on grades and archival internship evaluations, excluding contextual factors such as teaching approaches, motivation, and emotional well-being. Broader measures, including student perceptions and real-time feedback, are recommended for future research. Addressing communication and application-based gaps while reinforcing ethical practice will better prepare BSPT students for professional roles.

## Declaration of Generative AI use in the Writing Process

The authors declare the use of Artificial Intelligence (AI) in writing this paper. In particular, the authors used Grammarly, QuillBot, and Copilot in improving readability, Consensus AI in literature review, and Scribbr in formatting references. The authors take full responsibility for ensuring proper review and editing of the content generated using AI.

## References

- Alpine, L. M., O'Connor, A., McGuinness, M., & Barrett, E. M. (2020). Performance-based assessment during clinical placement: Cross-sectional investigation of a training workshop for practice educators. *Nursing and Health Sciences*, 23(1), 113–122. <https://doi.org/10.1111/nhs.12768>
- Alrazeeni, D., Younas, A., & Rasheed, S. P. (2021). Experiential Learning for Psychomotor Skills Development of Emergency Medical Services (EMS) Students: an Action Research. *Journal of Multidisciplinary Healthcare, Volume 14*, 2151–2159. <https://doi.org/10.2147/jmdh.s328408>
- Anton, N. E., Doster, D., Choi, J. N., Ritter, E. M., & Stefanidis, D. (2023). Neuropsychological differences between surgery Interns and Age-Matched Adults. *Journal of Surgical Education*, 80(11), 1641–1647. <https://doi.org/10.1016/j.jsurg.2023.07.022>
- Aristotle, S., & Ramraj, B. (2022). Assessment of Performance in Cognitive vs Affective Domain among First Year MBBS Students: A Cross-sectional Study. *Journal of Clinical and Diagnostic Research*. <https://doi.org/10.7860/jcdr/2022/5664.0.16976>
- Atout, M., & Nalubega, S. (2023). Views and experiences of using advanced technologies in higher education of healthcare professionals: A systematic mixed-method review. *Frontiers in Education*, 8. <https://doi.org/10.3389/educ.2023.1064697>
- Beurskens, R., Brueckner, D., & Muehlbauer, T. (2020). Effects of motor versus cognitive task prioritization during Dual-Task practice on Dual-Task performance in young adults. *Frontiers in Psychology*, 11. <https://doi.org/10.3389/fpsyg.2020.581225>
- Bezerra, J. (2022). Designing an online engineering course based on Bloom's Taxonomy. *Inted Proceedings*, 1, 1610–1616. <https://doi.org/10.21125/inted.2022.0483>

- Bloom, B.S. (1956) Taxonomy of Educational Objectives, Handbook: The Cognitive Domain. David McKay, New York.
- Cannity, K. M., Banerjee, S. C., Hichenberg, S., Leon-Nastasi, A. D., Howell, F., Coyle, N., Zaider, T., & Parker, P. A. (2020). Acceptability and efficacy of a communication skills training for nursing students: Building empathy and discussing complex situations. *Nurse Education in Practice*, 50, 102928. <https://doi.org/10.1016/j.nepr.2020.102928>
- CHED Memorandum Order No. 55. Series of 2017 (2017). Policies, Standards and Guidelines for the Bachelor of Science in Physical Therapy Program. <https://ched.gov.ph/wp-content/uploads/2018/05/CMO-No.-55-Series-of-2017-Policies-Standards-and-Guidelines-for-the-Bachelor-of-Science-in-Physical-Therapy-BSPT-Education.pdf>
- Cheng, X. (2023). ICAP Taxonomy of Modes of Cognitive Engagement: A Learner-Centered Theory Focusing on Observable Engagement Behaviors. *Science Insights Education Frontiers*. <https://doi.org/10.15354/sief.23.co211>
- Commission on Higher Education. (2012). *Policy-standard to enhance quality assurance (QA) in Philippine higher education through an outcomes-based and typology-based QA* (CHED Memorandum Order No. 46, s. 2012). <https://legacy.ched.gov.ph/2012-ched-memorandum-orders/>
- Cook, C., McCallum, C., Musolino, G., Reiman, M., & Covington, J. (2018). What Traits Are Reflective of Positive Professional Performance in Physical Therapy Program Graduates? A Delphi Study.. *Journal of allied health*, 47 2, 96-102 .
- Coates H. (2016). Assessing student learning outcomes internationally: Insights and frontiers. *Assessment and Evaluation in Higher Education*, 41, 662–676.
- Deane, F. P., Gonsalvez, C., Joyce, C., & Britt, E. (2018). Developmental trajectories of competency attainment amongst clinical psychology trainees across field placements. *Journal of Clinical Psychology*, 74(9), 1641–1652. <https://doi.org/10.1002/jclp.22619>
- Dias, D.L., Kamat, A. S., Gomes, S. S., Gomes, E. J., & Bhounsule, S.A. (2019). Quantitative Analysis of Competency Levels in Medical Interns of a Tertiary Care Hospital in India - A Questionnaire Based Cross Sectional Study. *The Journal of the Association of Physicians of India*, 67 9, 34-38 .
- Donaldson, M., Tyler, K., & Carroll, A. (2022). The effect of standardized patients for physical therapy students on behaving and communicating as a professional: a systematic review. *Physical Therapy Reviews*, 27, 464 - 476. <https://doi.org/10.1080/10833196.2022.2141039>.
- Dorsey, L. L., Kelly, P. V., Luetkemeyer, P. B., & Lojovich, J. M. (2018). Use of an Academic Professional Behavior Assessment and Intervention to Promote Professional Socialization. *Journal of allied health*, 47(3), 210–216.
- Dversdal, R. K., Gold, J. A., Richards, M. H., Chiovaro, J. C., Iossi, K. A., Mansoor, A. M., Hunter, A. J., & Desai, S. S. (2018). A 5-day intensive curriculum for interns utilizing simulation and active-learning techniques: addressing domains important across internal medicine practice. *BMC Research Notes*, 11(1). <https://doi.org/10.1186/s13104-018-4011-4>
- Engin, M., Gençdoğan, B., & Engin, A. (2024). A Taxonomic Approach on Learning Areas. *European Journal of Education and Pedagogy*. <https://doi.org/10.24018/ejedu.2024.5.3.583>
- European Union (2017). Council conclusions on a renewed EU agenda for higher education”, Official Journal of the European Union, C 429, 60, 3-7.
- Field, L., Gane, E., & Forbes, R. (2023). Clinical documentation during clinical placements: Perspectives of physiotherapy students and clinical educators. *Australian Journal of Clinical Education*, 12(1). <https://doi.org/10.53300/001c.71404>
- Forsey, J., Ng, S., Rowland, P., Freeman, R., Li, C., & Woods, N. (2021). The Basic Science of Patient–Physician Communication: A Critical Scoping Review. *Academic Medicine*, 96, S109 - S118. <https://doi.org/10.1097/ACM.0000000000004323>.
- Glory, J. & Habeeb, N. (2020). The impact of “competency-based assessment” in first-year medical undergraduate. *ProQuest*, 10 (5), 388-392. <https://doi:10.5455/njppp.2020.10.02044202013032020>
- Gosselin, D. (2020). *Competencies and learning outcomes*. [https://serc.carleton.edu/integrate/programs/workforceprep/competencies\\_and\\_LO.html](https://serc.carleton.edu/integrate/programs/workforceprep/competencies_and_LO.html)
- Harun, H., Rahman, A. W. A., Noorazman, A. S., Noor, S. N. F. M., & Sahak, A. a. M. (2018). The Effectiveness of Cognitive and Psychomotor Domain of Culinary Art Students’ Performance after Internship in Private Colleges. *MATEC Web of Conferences*, 150, 05021. <https://doi.org/10.1051/mateconf/201815005021>
- Hooper, L. & Sullivan, LM. (2014). Integrating competencies and learning outcomes in core courses for the MPH. *Public Health Rep.* 129(4), 376-81. doi: 10.1177/003335491412900414. <https://uwaterloo.ca/centre-for-teaching-excellence/resources/teaching-tips/blooms-taxonomy-learning-activities-and-assessments>
- Jain, S., Jain, B. K., Jain, P. K., & Marwaha, V. (2022). “Technology Proficiency” in Medical Education: worthiness for worldwide wonderful competency and sophistication. *Advances in Medical Education and Practice*, Volume 13, 1497–1514. <https://doi.org/10.2147/amep.s378917>
- Khalil, A. I., & Hashish, E. A. (2022). Exploring how reflective practice training affects nurse interns’ critical thinking disposition and communication skills. *Nursing Management*, 29(5), 20–26. <https://doi.org/10.7748/nm.2022.e2045>
- Kalu, M. E., Switzer-McIntyre, S., Quesnel, M., Donnelly, C., & Norman, K. E. (2020). Clinical Instructors’ Perceptions of Internationally Educated Physical Therapists’ Readiness to Practise during Supervised Clinical Internships in a Bridging Programme. *Physiotherapy Canada*, 73(2), 194–203. <https://doi.org/10.3138/ptc-2019-0067>
- Kennedy, D., & McCarthy, M. (2016). Learning outcomes in the ECTS Users' Guide 2015 - some areas of concern. *Journal of the European Higher Education Area*, 16, 1-16.
- Khidzir, N. Z., Daud, K. A. M., & Ibrahim, M. A. H. (2016). The Relationship among Student’s Domain of Learning Development Implementing Virtual Learning in Higher Learning Institutions. *International Journal of Information and Education Technology*, 6(6), 418–422. <https://doi.org/10.7763/ijiet.2016.v6.725>
- Kim, K. (2022). Mediation Effect of Grades and Major Satisfaction between Academic Adjustment and Academic Competency in College Students. *The Korean Society of Culture and Convergence*, 44(6), 269–286. <https://doi.org/10.33645/enc.2022.6.44.6.269>
- Kuboja, J. M., & Ngussa, B. M. (2015). Affective Learning and Cognitive Skills Improvement: Experience of Selected Schools in Arusha, Tanzania. *International Journal of Academic Research in Progressive Education and Development*, 4(2). <https://doi.org/10.6007/ijarped/v4-i2/1727>
- Mamin, F. A., & Hayes, R. (2018). Physiotherapy in Bangladesh: Inequality begets inequality. *Frontiers in Public Health*, 6. <https://doi.org/10.3389/fpubh.2018.00080>
- Miura, H., Endo, Y., Suzuki, S., Yasuoka, Y., Baba, H., Kimura, K., & Horimoto, Y. (2019). Measurement of physical therapists’ consciousness when teaching clinical interns. *Rigakuryoho Kagaku*, 34(2), 233–238. <https://doi.org/10.1589/rika.34.233>
- Mohammed, M., & Omar, N. (2020). Question classification based on Bloom’s taxonomy cognitive domain using modified TF-IDF and word2vec. *PLoS ONE*, 15(3), e0230442. <https://doi.org/10.1371/journal.pone.0230442>
- Morrone, J. M., & Pedlar, C. R. (2024). EEG-based neurophysiological indices for expert psychomotor performance

- a review. *Brain and Cognition*, 175, 106132. <https://doi.org/10.1016/j.bandc.2024.106132>
- Moore, K. A., O'Brien, B. C., & Thomas, L. R. (2020). "I Wish They Had Asked": a Qualitative Study of Emotional Distress and Peer Support During Internship. *Journal of General Internal Medicine*, 35(12), 3443–3448. <https://doi.org/10.1007/s11606-020-05803-4>
- Predovic, D., Dennis, J., & Jones, E. (2021). International internships and employability: a game-based assessment approach. *Higher Education Research & Development*, 41(4), 1231–1246. <https://doi.org/10.1080/07294360.2021.1889994>
- Priyanto, S., & Inderanata, R. N. (2020). Internship Students' work readiness: Case study in Metal Machining Department at Yogyakarta Vocational Training Center. *American Journal of Educational Research*, 8(2), 105–111. <https://doi.org/10.12691/education-8-2-6>
- Reaves, C., Martel, M., & Rose, K. (2024). Teaching Psychomotor Skills in Undergraduate Nursing Education: An Integrative review. *Journal of Nursing Education*, 63(7), 421–426. <https://doi.org/10.3928/01484834-20240505-01>
- Republic Act No. 10173, Data Privacy Act of 2012, § 4(d) (Philippines). <https://www.privacy.gov.ph/data-privacy-act/>
- Reubenson, A., Ng, L., & Gucciardi, D. (2020). The Assessment of Physiotherapy Practice tool provides informative assessments of clinical and professional dimensions of student performance in undergraduate placements: a longitudinal validity and reliability study. *Journal of Physiotherapy*, 66 (2), 113–119. <https://doi.org/10.1016/j.jphys.2020.03.009>
- Roegiers, X. (2016). *A conceptual framework for competencies assessment*. <https://unesdoc.unesco.org/ark:/48223/pf0000245195>
- Schwab, K., Moseley, B., & Dustin, D. (2018). Grading grades as a measure of student learning. *SCHOLE a Journal of Leisure Studies and Recreation Education*, 33(2), 87–95. <https://doi.org/10.1080/1937156x.2018.1513276>
- Shaikh, S., Daudpotta, S. M., & Imran, A. S. (2021). Bloom's learning outcomes' automatic classification using LSTM and pretrained word embeddings. *IEEE Access*, 9, 117887–117909. <https://doi.org/10.1109/access.2021.3106443>
- Singh, H., Singh, I., & Soni, R. K. (2024). Assessment of the emotional intelligence and its dimensions of medical interns. *International Journal of Contemporary Pediatrics*, 11(2), 172–175. <https://doi.org/10.18203/2349-3291.ijcp20240093>
- Sönmez, M. (2017). Association of cognitive, affective, psychomotor and intuitive domains in education. *Universal Journal of Educational Research*, 5(3), 347–356. DOI: 10.13189/ujer.2017.050307
- Stasielowicz, L. (2020). How important is cognitive ability when adapting to changes? A meta-analysis of the performance adaptation literature. *Personality and Individual Differences*, 166, 110178. <https://doi.org/10.1016/j.paid.2020.110178>
- Students Learning Through Competencies - Alberta Regional Professional Development Resources. (2019, June 24). Alberta Regional Professional Development Resources. <https://arpdcresources.ca/consortia/learning-through-competencies/>
- Tariq, A., Kashif, M., Zafar, M., Hanif, S., Ali, I., & Shafique, A. (2021). Clinical competencies of physical therapy interns in patients' management skills. *Rehman Journal of Health Sciences*, 2(2), 52–55. <https://doi.org/10.52442/rjhs.v2i2.64>
- Timmerberg, J. F., Chesbro, S. B., Jensen, G. M., Dole, R. L., & Jette, D. U. (2022). Competency-Based Education and Practice in Physical Therapy: It's Time to Act! *Physical Therapy*, 102(5). <https://doi.org/10.1093/ptj/pzac018>
- University of Nevada (2023). Constructing program outcomes. <https://www.unlv.edu/assessment/resources/constructing#:~:text=Program%20outcomes%20are%20statements%20conveyin,g,have%20received%20their%20intended%20degree.>
- Van Veld, R., Slaven, E. J., Reynolds, B., Shupe, P., & Woolery, C. (2018). First-Year Doctor of Physical therapy students demonstrate change in coping with stress. *Journal of Physical Therapy Education*, 32(2), 138–144. <https://doi.org/10.1097/jte.0000000000000037>
- Wollesen, B., Janssen, T. I., Müller, H., & Voelcker-Rehage, C. (2022). Effects of cognitive-motor dual task training on cognitive and physical performance in healthy children and adolescents: A scoping review. *Acta Psychologica*, 224, 103498. <https://doi.org/10.1016/j.actpsy.2022.103498>
- Yoshida, Y., Uno, T., Tanaka, H., Hakosaki, I., Shigeta, K., & Yano, R. (2022). Cognitive changes with psychomotor skill acquisition through blended learning among nursing students: A qualitative study. *Nurse Education in Practice*, 65, 103486. <https://doi.org/10.1016/j.nepr.2022.103486>
- Yousef, A. S., Shazly, M. M., & Omar, H. A. (2020). Soft skills training strategy and its effect on nurse interns' civil behavior. *Evidence-Based Nursing Research*, 2(3), 8. <https://doi.org/10.47104/ebnrojs3.v2i3.132>
- Zlatkin-Troitschanskaia O., Shavelson R. J., Kuhn C. (2015). The international state of research on measurement of competency in higher education. *Studies in Higher Education*, 40(3), 393–411.
- Zlatkin-Troitschanskaia, O., Pant, H. A., Toepper, M., Lautenbach, C., & Molerov, D. (2017). Valid Competency Assessment in Higher Education: Framework, Results, and Further Perspectives of the German Research Program KoKoHs. *AERA Open*, 3(1). <https://doi.org/10.1177/2332858416686739>