



SCIREA Journal of Education

ISSN: 2995-3901

<http://www.scirea.org/journal/Education>

July 26, 2024

Volume 9, Issue 1, February 2024

<https://doi.org/10.54647/education880534>

Transfer and Scale-Up of Agile Frameworks into Education: A Review and Retrospective of OKR and SCRUM

Benjamin Zierock¹, Matthias Blatz² and Sieer Angar³

¹SRH University Heidelberg, Ludwig-Guttman-Straße 6, 69123 Heidelberg, Germany

²Heidelberg iT Corporation (USA), 80 Pine Street, Floor 24, New York, NY 10005 USA

³Socratyes GmbH, Waldhofer Str. 102, 69123 Heidelberg, Germany

Abstract

Agile frameworks such as Objectives and Key Results (OKR) and SCRUM, originally developed for the software industry, are increasingly being considered for application in educational settings. This paper reviews the transfer and scale-up of these agile methodologies into education, aiming to analyze their effectiveness, benefits, and challenges. Through a systematic review of existing literature and detailed analysis of case studies, the study finds that agile frameworks can enhance collaboration, project management, and student outcomes.

However, challenges such as resistance to change, scalability, and training requirements are significant barriers. The findings suggest that while agile methodologies hold promise for transforming educational practices, careful consideration and tailored implementation strategies are crucial.

This study provides recommendations for educators and policymakers, and identifies areas for future research to further explore the long-term impacts of agile frameworks in education. The

analysis builds upon foundational concepts from "A Scrum Book: The Spirit of the Game" by Jeff Sutherland and James O. Coplien (2019) and " Measure What Matters OKRs: The Simple Idea that Drives 10x Growth" by John Doerr (2018).

Keywords: Agile Frameworks , OKR, SCRUM, Transfer, Review, Retrospective

Introduce Agile Frameworks and Their Origins in Software Development and Business

Agile frameworks have their roots in the software development industry, emerging as a response to the limitations of traditional project management methodologies like the Waterfall model. In the early 2000s, software development faced significant challenges, including rapidly changing requirements, long development cycles, and a lack of flexibility in responding to customer needs. The traditional sequential approach often led to delays, budget overruns, and products that did not fully meet user expectations.

To address these issues, a group of software developers introduced the Agile Manifesto in 2001, which outlined a set of values and principles aimed at improving the software development process. The core values of the Agile Manifesto emphasize individuals and interactions over processes and tools, working software over comprehensive documentation, customer collaboration over contract negotiation, and responding to change over following a plan. These values foster a more flexible, iterative, and customer-focused approach to project management.

Among the various agile methodologies, two frameworks have gained significant prominence: Objectives and Key Results (OKR) and SCRUM.

(see figure 1)

Aspect	OKR (Objectives and Key Results)	SCRUM (Agile Framework)
Purpose	Align and track measurable goals and outcomes across an organization	Manage and complete projects through iterative development cycles
Origins	Developed by Intel, popularized by Google and other tech	Developed by Jeff Sutherland and Ken Schwaber for software development

	companies	
Structure	<ul style="list-style-type: none"> - Objectives: Qualitative goals - Key Results: Quantitative measures to achieve objectives 	<ul style="list-style-type: none"> - Roles: SCRUM Master, Product Owner, Development Team - Artifacts: Product Backlog, Sprint Backlog, Increment - Events: Sprint Planning, Daily Stand-up, Sprint Review, Sprint Retrospective
Time Frame	Quarterly cycles typically; may vary depending on organization	Iterative cycles (Sprints) typically lasting 2-4 weeks
Focus	Long-term and short-term goal setting and achievement	Short-term project execution and incremental delivery
Transparency	Objectives and Key Results are often visible to all members of the organization	Transparency through SCRUM artifacts and regular meetings
Feedback Mechanism	Regular check-ins (often weekly) and quarterly reviews	Daily Stand-ups, Sprint Reviews, and Retrospectives provide continuous feedback
Measurement	Success measured by the completion of Key Results	Success measured by the completion of Sprint goals and overall project progress
Flexibility	High-level goals with flexible approaches to achieving them	Flexible scope within Sprints but with fixed time frames and deliverables
Collaboration	Encourages alignment across the organization	Emphasizes team collaboration and self-organization
Adaptation	Adapt goals and key results based on progress and changing priorities	Adapt project scope and tasks based on feedback and iteration outcomes
Usage in Education	Aligning educational goals with measurable outcomes for students and staff	Managing educational projects and iterative curriculum development
Strengths	- Promotes strategic alignment	- Enhances teamwork and

	and focus - Encourages ambitious goal setting and accountability	collaboration - Allows for rapid adaptation and continuous improvement
Challenges	- Requires clear and consistent goal-setting processes - May face alignment issues if not well-communicated	- Requires commitment to agile principles and roles May face resistance to change in traditional settings

Fig. 1 Comparison Between OKR (Objectives and Key Results) and SCRUM (Agile Framework) in Educational Contexts

Objectives and Key Results (OKR)

OKR is a goal-setting framework that helps organizations define and track objectives and their outcomes. Originally developed by Intel in the 1970s and later popularized by Google, OKR promotes setting ambitious goals (objectives) and measurable outcomes (key results) that align with the organization’s vision and strategic direction. The framework encourages transparency, alignment, and frequent progress reviews, fostering a culture of accountability and continuous improvement. [1]

SCRUM

SCRUM is an agile process framework primarily used in software development but adaptable to various industries. It was developed in the early 1990s by Jeff Sutherland and Ken Schwaber. SCRUM breaks down complex projects into smaller, manageable iterations called sprints, typically lasting two to four weeks. Each sprint results in a potentially shippable product increment. The SCRUM framework includes defined roles (such as SCRUM Master, Product Owner, and Development Team), events (like Sprint Planning, Daily Stand-ups, Sprint Review, and Sprint Retrospective), and artifacts (such as Product Backlog, Sprint Backlog, and Increment). This structure promotes collaboration, accountability, and iterative progress, allowing teams to quickly adapt to changes and deliver value continuously.

Agile methodologies have revolutionized project management in the software industry by prioritizing customer needs, enhancing team collaboration, and enabling rapid adaptation to change. These frameworks have since been adopted across various business sectors,

demonstrating their versatility and effectiveness in managing diverse projects. The principles of agility—iterative development, customer-centricity, and responsiveness—have shown potential for broader application, including in the field of education. This paper explores how the agile frameworks of OKR and SCRUM can be effectively transferred and scaled up within educational settings, aiming to enhance educational practices and outcomes. [2]

Agile Frameworks in Education: Discuss the Increasing Interest in Applying Agile Methodologies

There is a growing recognition of the potential benefits of applying agile methodologies, such as OKR and SCRUM, in educational settings. Traditionally, education has been structured around fixed curricula, rigid timelines, and hierarchical teaching methods. However, the evolving landscape of education, influenced by technological advancements and changing student needs, has sparked interest in more flexible and adaptive approaches to learning and management.

Flexibility and Adaptability

Agile methodologies are characterized by their flexibility and adaptability, which align closely with the needs of modern education. In an era where educational institutions are increasingly challenged to respond swiftly to changing demands—such as shifts in technology, pedagogical approaches, and student expectations—agile frameworks offer a structured yet nimble approach to managing educational initiatives. This adaptability allows educators to iterate on curriculum development, respond to student feedback promptly, and adjust teaching strategies in real-time to optimize learning outcomes. [3]

Collaboration and Teamwork

Another key aspect of agile methodologies is their emphasis on collaboration and teamwork. In educational settings, fostering collaboration among educators, administrators, students, and other stakeholders is essential for creating a cohesive learning environment. Agile frameworks promote cross-functional teams and regular communication through practices like daily stand-ups (brief team meetings), which facilitate knowledge sharing, problem-solving, and collective decision-making. This collaborative approach can enhance coordination among departments, improve project management, and promote a sense of ownership and accountability among stakeholders.

Student-Centric Approach

Agile methodologies prioritize the needs and experiences of end-users—in this case, students. By adopting agile principles, educators can design student-centered learning experiences that cater to individual learning styles, interests, and pace of learning. For instance, applying OKR in education allows institutions to set clear objectives aligned with educational outcomes and measure progress through key results, thereby fostering a transparent and goal-oriented learning environment. [4]

Continuous Improvement

A core tenet of agile methodologies is continuous improvement. Educational institutions are increasingly recognizing the value of ongoing evaluation and adaptation to enhance teaching practices, curriculum design, and institutional policies. SCRUM, with its iterative cycles of planning, execution, review, and adaptation, provides a structured framework for continuous improvement in educational programs and processes. This iterative approach encourages educators to experiment with new teaching methods, integrate feedback from students and colleagues, and refine educational strategies based on evidence of effectiveness.

Alignment with 21st Century Skills

In today's knowledge-driven economy, there is a growing emphasis on developing 21st-century skills such as critical thinking, collaboration, communication, and creativity. Agile methodologies inherently support the development of these skills by promoting active engagement, problem-solving, and adaptability among students and educators alike. By integrating agile principles into educational practices, institutions can better prepare students for future careers and lifelong learning in a rapidly evolving global landscape. [5]

In conclusion, the increasing interest in applying agile methodologies in educational settings reflects a broader movement towards fostering innovation, responsiveness, and student-centeredness within education. By embracing agile frameworks like OKR and SCRUM, educational institutions can potentially enhance educational outcomes, improve organizational effectiveness, and better meet the evolving needs of students and stakeholders in the digital age.

State the Goals of the Paper

The primary objective of this paper is to comprehensively review existing literature, analyze case studies, and explore the potential benefits and challenges associated with implementing Objectives and Key Results (OKR) and SCRUM methodologies in educational settings.

Goals Breakdown:

1. **Review Existing Literature:** Conduct a thorough examination of the current body of literature concerning the application of agile frameworks—specifically OKR and SCRUM—in education. This review will encompass academic research, case studies, and relevant theoretical frameworks to establish a foundational understanding of agile methodologies in educational contexts.
2. **Analyze Case Studies:** Evaluate specific instances where educational institutions have implemented OKR and SCRUM. By analyzing these case studies, the paper aims to extract valuable insights into the practical implications, success factors, challenges encountered, and outcomes achieved through the adoption of agile methodologies in education.
3. **Explore Potential Benefits:** Identify and discuss the potential advantages of integrating OKR and SCRUM in educational settings. This exploration will focus on how these agile frameworks can enhance collaboration among educators, improve project management practices, foster student engagement and achievement, and promote a culture of continuous improvement within educational institutions.
4. **Examine Challenges:** Investigate the obstacles and challenges that educational institutions may face when implementing OKR and SCRUM. This examination will address issues such as resistance to change, organizational readiness, scalability concerns, resource constraints, and the adaptation of agile principles to the unique requirements of the educational environment.

By achieving these objectives, this paper aims to provide educators, policymakers, and stakeholders in the field of education with valuable insights and practical recommendations for leveraging agile methodologies to drive positive educational outcomes and institutional effectiveness. The findings and analyses presented will contribute to a deeper understanding

of how agile frameworks can be strategically applied to enhance educational practices in today's dynamic educational landscape.

Literature Review

1. Overview of Agile Frameworks: Objectives and Key Results (OKR) and SCRUM

Objectives and Key Results (OKR):

OKR is a goal-setting framework popularized by companies like Intel and Google. It aims to align individual, team, and organizational goals with measurable outcomes. The framework involves setting ambitious objectives and defining key results that indicate progress towards those objectives. OKRs are typically set at multiple levels within an organization—ranging from high-level strategic goals to departmental and individual objectives. Regular reviews and updates ensure alignment and focus on achieving desired outcomes.

SCRUM:

SCRUM is an agile project management framework that emphasizes iterative development and collaboration. Originally developed for software development, SCRUM breaks down projects into short, fixed-length iterations called sprints. Each sprint typically lasts 2-4 weeks and results in a potentially shippable product increment. SCRUM teams are self-organizing and cross-functional, comprising roles such as SCRUM Master (facilitator), Product Owner (representing stakeholders), and Development Team. Key SCRUM events include Sprint Planning, Daily Stand-ups, Sprint Review, and Sprint Retrospective, which enable teams to adapt and improve continuously.

2. Agile in Business vs. Education

Business Context:

In business, agile methodologies like OKR and SCRUM are widely adopted to enhance flexibility, responsiveness to market changes, and customer satisfaction. OKRs help organizations prioritize goals and align efforts across teams, fostering a culture of transparency and accountability. SCRUM enables teams to deliver value incrementally, respond to changing requirements, and maintain high levels of productivity and quality.

Education Context:

Agile methodologies are increasingly applied in education to address challenges such as curriculum adaptation, student engagement, and organizational flexibility. However, their implementation differs from business contexts due to unique educational goals and stakeholders. Educators use OKRs to set educational objectives aligned with student outcomes and institutional priorities, promoting clarity and focus. SCRUM is adapted to manage educational projects, facilitate collaboration among educators, and support iterative curriculum development and student-centered learning experiences.

3. Previous Studies on the Application of Agile Frameworks in Educational Settings

Previous research on agile frameworks in education has explored various applications and outcomes:

- **Curriculum Development:** Studies have examined how SCRUM facilitates iterative curriculum design and adaptation based on student feedback and learning outcomes.
- **Student Engagement:** Research has shown that agile methodologies enhance student engagement by promoting active participation, personalized learning paths, and timely feedback loops. [6]
- **Organizational Adaptability:** Educational institutions adopting agile frameworks report improved responsiveness to changes in educational policies, technology integration, and stakeholder needs. [7]
- **Challenges and Solutions:** Studies highlight challenges such as resistance to change, integration with existing educational practices, and the need for training and support. Solutions include tailored implementation strategies, professional development, and leadership support to foster successful adoption. [8]

Methodology

1. Review Criteria

The criteria for selecting the literature and case studies reviewed in this paper are as follows:

- **Time Frame:** The literature reviewed spans from 2018 to 2023. This period was chosen to ensure that the research reflects the most current trends, practices, and insights in the application of agile frameworks in education.
- **Focus Areas:** The selected literature focuses on three main areas: project management, agile methodologies, and their application in educational settings. This ensures a comprehensive understanding of how agile principles are being integrated into education.
- **Expert Interviews:** The study includes insights from interviews with SCRUM Masters and OKR Masters who have more than three years of experience and have managed at least ten projects. This criterion ensures that the insights gathered are from seasoned professionals with substantial practical experience.

2. Data Collection

The data collection process for this study employed a mixed methodology approach, combining both qualitative and quantitative methods to provide a comprehensive understanding of the implementation of OKR and SCRUM in education.

- **Literature Review:** A systematic review of academic papers, case studies, relevant articles, and books published between 2018 and 2023 was conducted. This involved searching academic databases such as Google Scholar, PubMed, and educational repositories using keywords like "agile frameworks in education," "SCRUM in education," and "OKR in education."
- **Interviews:** Semi-structured interviews were conducted with SCRUM Masters and OKR Masters. These interviews aimed to gather detailed insights into their experiences with implementing agile methodologies in educational settings. The interviewees were selected based on their extensive experience (more than three years) and involvement in at least ten projects, ensuring the reliability and depth of the information collected.
- **Case Studies:** Specific case studies of educational institutions that have implemented SCRUM and OKR were analyzed. These case studies provided concrete examples of how agile methodologies are being applied, the challenges faced, and the outcomes achieved.

- **Academic Research:** Data from peer-reviewed academic journals, conference papers, and books were also included to support the findings from the literature review and interviews. Key sources include foundational texts such as "A Scrum Book: The Spirit of the Game" by Jeff Sutherland and James O. Coplien (2019) and "Measure What Matters" by John Doerr (2018), which provide essential context and theoretical background for understanding agile methodologies.

This mixed-methods approach ensures a robust and comprehensive analysis of the transfer and scale-up of agile frameworks into educational settings, combining theoretical insights with practical experiences from industry experts.

Analysis and Discussion

1. Effectiveness: Analyze the Effectiveness of SCRUM and OKR in Educational Settings

The implementation of SCRUM and OKR in educational settings has shown varying degrees of effectiveness, largely influenced by the context and manner of application.

SCRUM Effectiveness:

- **Iterative Learning:** SCRUM's sprint cycles have proven effective in managing curriculum development and course delivery. By breaking down educational content into smaller, manageable segments, educators can iteratively refine teaching materials and methods based on student feedback and performance data.
- **Team Collaboration:** SCRUM fosters enhanced collaboration among teachers, administrators, and students. Regular stand-up meetings and sprint reviews ensure continuous communication and alignment of educational goals.

OKR Effectiveness:

- **Goal Alignment:** OKRs are effective in aligning educational objectives at various levels—from institutional goals to classroom-specific outcomes. This alignment ensures that all stakeholders are working towards common goals, enhancing coherence in educational initiatives.
- **Transparency and Accountability:** The transparency inherent in OKR implementation promotes accountability among educators and students. Regular

check-ins on key results help maintain focus and track progress towards educational objectives.

2. Benefits: Discuss the Benefits Observed

The application of SCRUM and OKR in education has led to several notable benefits:

- **Increased Collaboration:** Both frameworks promote a culture of teamwork and collaboration. SCRUM's structure of frequent meetings and collaborative tasks fosters a strong team dynamic among educators and students. OKRs facilitate alignment and teamwork by making objectives and key results visible to all stakeholders.
- **Better Project Management:** Agile methodologies improve project management within educational institutions. SCRUM's iterative approach allows for flexible adaptation to changes, while OKRs provide a clear roadmap for achieving long-term educational goals.
- **Improved Student Outcomes:** Agile frameworks have positively impacted student outcomes. SCRUM's iterative feedback loops enable timely interventions and adjustments in teaching strategies, enhancing student learning experiences. OKRs help students and educators set and achieve specific, measurable goals, contributing to improved academic performance.

3. Challenges: Highlight the Challenges Faced

Despite the benefits, implementing SCRUM and OKR in educational settings presents several challenges:

- **Resistance to Change:** Educational institutions often face resistance from staff and students who are accustomed to traditional teaching methods. Overcoming this resistance requires effective change management strategies and ongoing support.
- **Scalability Issues:** Scaling agile methodologies across larger educational institutions can be challenging. SCRUM, with its emphasis on small, self-organizing teams, may need adaptation to fit larger organizational structures. Similarly, maintaining alignment with OKRs across multiple departments requires careful planning and coordination.

- **Training Requirements:** Successful implementation of SCRUM and OKR requires comprehensive training for educators and administrators. Developing a deep understanding of agile principles and practices is crucial for overcoming initial implementation hurdles and achieving long-term success.

4. Comparison: Compare the Outcomes and Suitability of SCRUM vs. OKR in Different Educational Contexts

SCRUM:

- **Suitability:** SCRUM is particularly suitable for project-based learning environments and institutions that emphasize collaborative, hands-on education. Its iterative nature supports continuous improvement and responsiveness to student needs.
- **Outcomes:** Institutions using SCRUM report enhanced teamwork, flexibility in curriculum development, and improved student engagement. However, the success of SCRUM depends on the institution's ability to foster a collaborative culture and adapt the framework to educational contexts.

OKR:

- **Suitability:** OKR is well-suited for institutions focusing on strategic alignment and measurable outcomes. It is particularly effective in environments where clear goal setting and progress tracking are critical.
- **Outcomes:** Educational institutions implementing OKRs observe improved goal clarity, accountability, and alignment of educational objectives. However, the effectiveness of OKRs hinges on the institution's commitment to regular reviews and adjustments based on key results.

Comparison:

- **SCRUM vs. OKR:** While both frameworks offer significant benefits, their suitability depends on the specific needs and context of the educational institution. SCRUM is more dynamic and adaptable for iterative projects and collaborative environments, while OKRs provide a structured approach to goal setting and performance tracking. Combining elements of both frameworks can also be beneficial, leveraging the

iterative, collaborative nature of SCRUM with the strategic focus of OKRs to create a comprehensive agile approach to education.

In summary, the analysis reveals that while both SCRUM and OKR have proven effective in enhancing educational practices, their success is contingent upon careful implementation, adaptation to specific educational contexts, and ongoing commitment to agile principles.

Recommendations

1. Best Practices: Suggest Best Practices for Implementing Agile Frameworks in Education Based on the Findings

Initial Training and Education:

- **Comprehensive Training:** Provide thorough training for educators, administrators, and students on agile principles, SCRUM practices, and OKR methodology. This ensures all stakeholders understand the frameworks and can effectively participate in their implementation.
- **Pilot Programs:** Start with pilot programs to test and refine agile practices in a controlled environment before scaling them across the institution.

Adaptation and Flexibility:

- **Tailor Frameworks:** Customize SCRUM and OKR practices to fit the unique needs and culture of the educational institution. This includes adjusting sprint lengths, meeting structures, and goal-setting processes to suit educational contexts.
- **Iterative Feedback:** Establish regular feedback loops to continuously gather input from educators and students, allowing for ongoing adjustments and improvements to the agile practices.

Collaboration and Communication:

- **Facilitate Collaboration:** Foster a collaborative culture by promoting teamwork and open communication. Use SCRUM ceremonies like daily stand-ups and sprint reviews to enhance coordination and information sharing.

- **Transparent Objectives:** Ensure that OKRs are visible and accessible to all stakeholders, promoting transparency and alignment across the institution.

Support and Resources:

- **Dedicated Support:** Provide ongoing support through agile coaches or facilitators who can assist with the implementation and address challenges as they arise.
- **Resource Allocation:** Allocate necessary resources, including time, tools, and training materials, to support the successful adoption of agile frameworks.

2. Scalability: Discuss Strategies for Scaling Up These Frameworks from Small Projects to Institution-Wide Adoption

Phased Implementation:

- **Incremental Scaling:** Scale up the implementation gradually, starting with small, manageable projects and expanding to larger initiatives as the institution gains experience and confidence with agile practices.
- **Departmental Rollout:** Begin with specific departments or teams that are more open to innovation and gradually involve other parts of the institution.

Standardization and Consistency:

- **Develop Standards:** Create standardized guidelines and practices for SCRUM and OKR implementation to ensure consistency across different teams and departments.
- **Centralized Coordination:** Establish a centralized team or committee to oversee the agile transformation, ensuring alignment and coordination across the institution.

Evaluation and Adaptation:

- **Continuous Evaluation:** Regularly evaluate the effectiveness of agile practices through surveys, interviews, and performance metrics. Use this data to make informed adjustments and improvements.

- **Scalability Plans:** Develop clear plans for scaling agile frameworks, including strategies for maintaining quality and effectiveness as the scope of implementation expands.

3. Future Research: Identify Areas for Further Research, Such as Long-Term Impact Studies and the Development of Hybrid Models

Long-Term Impact Studies:

- **Sustained Benefits:** Investigate the long-term impact of SCRUM and OKR on educational outcomes, student engagement, and institutional efficiency to understand the sustained benefits and potential drawbacks.
- **Evolution Over Time:** Study how agile practices evolve over time within educational settings and their effects on organizational culture and performance.

Hybrid Models:

- **Combining Frameworks:** Explore the development and effectiveness of hybrid models that integrate elements of both SCRUM and OKR, tailored specifically for educational contexts.
- **Innovative Practices:** Research innovative agile practices and adaptations that emerge from educational institutions, contributing to the broader body of knowledge on agile methodologies.

Comparative Studies:

- **Contextual Comparison:** Conduct comparative studies between different educational institutions implementing agile frameworks to identify best practices and common challenges across various contexts and environments.

1. Summarize the Key Findings and Their Implications for Educators and Policymakers

The analysis of SCRUM and OKR implementations in educational settings reveals that agile frameworks can significantly enhance collaboration, project management, and student outcomes. Key findings indicate that:

- **SCRUM:** Promotes iterative learning and teamwork, leading to flexible curriculum development and improved student engagement.
- **OKR:** Facilitates goal alignment and accountability, resulting in clear objectives and measurable progress.

However, challenges such as resistance to change, scalability issues, and training requirements must be addressed to ensure successful implementation. These findings suggest that educators and policymakers should consider adopting agile methodologies to foster a more responsive and effective educational environment.

2. Reiterate the Potential of Agile Frameworks to Transform Educational Practices

Agile frameworks like SCRUM and OKR have the potential to transform educational practices by introducing flexibility, fostering collaboration, and enhancing goal alignment. By embracing these methodologies, educational institutions can better adapt to changing demands, improve student outcomes, and create a culture of continuous improvement. The strategic implementation of agile practices holds promise for driving innovation and excellence in education, ultimately benefiting educators, students, and the broader educational community.

Citation

- [1] Doerr, J. (2018). *Measure What Matters: OKRs: The Simple Idea that Drives 10x Growth*. Vereinigtes Königreich: Penguin Books Limited.
- [2] Sutherland, J., & Coplien, J. O. (2019). *A Scrum Book: The Spirit of the Game*.
- [3] Blomstrom, D. (2023). *Tech-Led Culture: Unlock the Full Potential of Your Business and People*. Vereinigtes Königreich: Kogan Page.
- [4] Mezick, D., Pfeffer, J., Pontes, D., Sasse, M., Sheffield, M., Shinsato, H., Kold-Taylor, L. (2019). *Das OpenSpace Agility Handbuch: Organisationen erfolgreich transformieren: gemeinsam, freiwillig, transparent*. Deutschland: peppair.
- [5] *Future Skills: 30 Zukunftsentscheidende Kompetenzen und wie wir sie lernen können*. (2021). Deutschland: Vahlen.
- [6] Rush, D. E., & Connolly, A. J. (2020). An agile framework for teaching with Scrum in the IT project management classroom. *Journal of Information Systems Education*, 31(3), 188-201.

- [7] Salza, P., Musmarra, P., & Ferrucci, F. (2019). Agile methodologies in education: A review: Bringing methodologies from industry to the classroom. In *Agile and Lean Concepts for Teaching and Learning* (pp. 25-40). Springer. https://doi.org/10.1007/978-981-13-2751-3_2
- [8] Sharp, J. H., & Lang, G. (2018). Agile in teaching and learning: Conceptual framework and research agenda. *Journal of Information Systems Education*, 29(2), 45-52.