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| Study no | Teaching Strategy used | Reported learning outcome | Blooms level of taxonomy | Types of outcome (Cognitive, Motivational, behavioural) |
| S2 | Project Based Learning | Offer a collection of patterns and anti-patterns that help educational institutions to design, implement and operate physical environments, curricula and teaching materials, and to plan interventions that may be required for project-based start-up education. | Apply | Cognitive |
| S5 | Virtual learning management system | Moodle Improved understanding of individual learning style preferences, enabling tailored educational experiences through data-driven learning platforms. | Understand | Cognitive |
| S6 | Computer supported collaborative learning (CSCL) | Students showed a dramatic increase on productivity when using the CLPL platform.  Students reported on feeling highly confident in developing the applications. | Apply | Cognitive / Behavioural / Motivational |
| S7 | Agile Based Learning | The agile method selected to introduce architecting activities have proven to be mostly effective.  Using our approach, students perceive the value of the architecting  activities and see the approach as complementary to agile software  development. | Understand | Cognitive |
| S9 | Agile Based Learning | Students’ knowledge of Scrum was improved when students were given suitable instructional methods according to the processing dimension of the students’ learning style | Apply | Cognitive / Behavioural |
| Sll | Gamification | Gamification helps engage students in either a particular topic or a  whole course. Students’ overall performance and learning out-  comes were also found to have more positive than negative re-  sults, and it also improved the adoption of SE best practices. | Apply | Cognitive / Behavioural / Motivational |
| S14 | Flipped classroom approach | Students improved their ability to reason and analyse SA design trade-offs and constraints. | Analyze | Cognitive |
| S15 | Project-Based Learning through Course Evolution | Strongly favour a project- based version of teaching architecture even at the undergraduate level | Evaluate | Cognitive |
| S16 | End to End Project-based | Students are mostly accepting of the project-based course and adequately demonstrating recall and application. | Apply | Cognitive/Behavioural |
| S17 | Platform-based lightweight projects | Public PaaS resources are satisfying of students to build up lightweight software systems while the small to medium student’s projects can support experimental learning in the software architecture domain Secondly the public feature of the employed PaaS services largely facilitates and foster students’ teamwork and collaboration in suitable project  From the teacher’s perspective, the publicly accessible PaaS platforms make student project easy to evaluate by allowing to check the project system runtime online.  Fourthly, utilizing the personal account associated PasS account reduces the plagiarism in student projects | Apply | Cognitive/Behavioural |
| S20 | Game based Learning | Game project students created more complex software architectures and applied more design patterns. Robot project students performed better in written exams, indicating stronger retention of theoretical SA concepts.  Game project students spent more time on implementation, improving their practical SA skills | Create | Cognitive /Behavioural |
| S21 | Model-Driven Teaching | Students express the best result in data models design Practitioners have positive experiences with using visualization and model in interactions with client during development process.  Student result in pre-exams assessment showed that they have the best result in data modelling. | Apply | Cognitive/Behavioual |

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| S22 | Scaffolded Requirements to SA learning | Students have opportunities to experience complex systems phenomena in ways that will let them enhance both their ontological and conceptual understandings.  Students solve authentically interesting problems and projects that involve collaborative and cooperative interactions  Students exhibit far transfer by applying these  understanding across subject areas in our subsequent capstone course | Apply | Cognitive /Behavioural/Motivational |
| S23 | Game based Learning | The Smart Decisions game can indeed be a useful tool to complement teaching software architecture design. One benefit of using this game is that it allows the design process to be simulated quickly | Understand | Cognitive |
| S24 | Microservices-based problem-solving | Students work in teams and solve real-world problems with Microservice architecture, and at the same time practice to become developers with strong technical, social and cognitive skills thereby meeting demand for the increasing need for software developer | Create | Cognitive /Motivational, Behavioural |
| S25 | Model driven engineering (MDE) | Students benefit most when courses combine modelling theory with practical tool-based exercises. Courses that emphasize collaborative modeling and model validation report better engagement. | Understand | Cognitive /Motivational, Behavioural |
| S26 | Queueing modelling Approach | The queueing modeling led to improving the  learning outcome quality by 14.8% for assignment and 20.2%  for the exam and growing the task success by 9.9% and 17.9%  respectively. In addition, the gap in the learning outcomes quality and task success achieved at assignment and exam was  reduced, respectively, by 8.0% and 5.4%, so the forgetting effect was reduced. | Apply | Cognitive/Behavioural |
| S29 | Teach traditional classes in software architecture education/ Problem-based learning/ Case-based learning | NA | NA | NA |
| S30 | Product Based Learning/ Apprentice learning | Student were asked to work on a projects that resembles real life software products which resulted in student positively spent more time in coding (nearly 6 hours per week).  Mitigated issues related to plagiarism  Improved learning rates for programming assignments | Apply | Motivational/cognitive/behavioural |
| S31 | Patterns-based approach | Demonstrates improved scalability and adaptability of educational technologies. The literature presented an architecture that integrates Pattern-Oriented Instructional Design that is driven by instructional design methodologies and Pattern-Oriented Software Architecture that drives the design of educational technologies. It also demonstrated the application of approach to model patterns in adult literacy case study in India. The literature also provided an implementation of the approach that generates instructional design authoring tools based on patterns. The literature claimed that it demonstrated a first step that addresses some challenges during design of educational technologies through solutions in software engineering. | Apply | Cognitive |
| S32 | Abstract Modellling | The integration of abstraction and modeling aims to equip students with foundational knowledge to navigate enterprise software development effectively. | Apply | Cognitive |
| S33 | Abstraction and System Thinking | Students demonstrated proficiency in modelling functions but showed lower proficiency in modelling structures and behaviours, indicating areas needing instructional improvement. | Understand | Cognitive |
| S34 | Student Ownership of Learning (SOL) | Demonstrates improved student engagement and learning outcomes. | Understand | Cognitive/ Behavioural |
| S35 | Collaborative Decision-making | Demonstrates improved understanding of embedded systems and critical thinking skills. | Understand | Cognitive/ Behavioural |
| S36 | Project-based learning | Demonstrates positive student attitudes and improved collaboration skills. | Understand | Cognitive/Motivational/Behavioural |
| S37 | Usability-Supporting Architecture Patterns (USAPs) | Software engineering graduate students achieved significantly better results in a software architecture design task using a paper-based version of USAPs without researcher intervention than they did using only a usability scenario. | Understand | Cognitive/Motivational/Behavioural |
| S38 | Adapted Learning Contract Strategy | Students achieved a high percentage of the maximum score corresponding to the tasks in the adapted learning contract.  The adapted learning contract fosters early engagement, and that the order in which tasks are offered is very relevant.  Beyond alleviating the possible negative effect of group size increase on student performance, either directly or through the impact of group size on attendance and participation, the early implication and formative contract seem to have resulted in a sizeable improvement in student performance. | Apply | Cognitive/ Motivational/Behavioural |
| S39 | Mobile Project-based Learning | The project completion rate for the group which used mobile devices were higher than those who were not allowed to use. Students reported increased understanding of course concepts, improved practical experience, and enhanced motivation and engagement through the Mobile-PBL approach. | Apply | Cognitive/ Motivational/Behavioural |
| S40 | Collaborative decision-making teaching strategy | The approach led to improved understanding of decision-making processes, enhanced collaboration skills, and better preparedness for industry roles among students. | Understand | Cognitive/ Motivational/Behavioural |
| S41 | Scrum | Learning outcomes and student satisfaction were substantially better than in previous years. | Understand | Cognitive/behavioural |
| S42 | Case-based learning | Reports improvements in learners' understanding and application of software architecture principles, with varying effectiveness between PBL and CBL approaches. | Apply | Cognitive/behavioural |
| S43 | Problem-based learning | One of the main outcomes was an intuitive prototype knowledge-based learning environment on virtual learning environment for software components-based design and implementation techniques. It provided excellent learning experience for students to learn advanced topics such as software components and service computing. | Create | Cognitive/ Motivational/Behavioural |
| S44 | Software Product Line Architecture | Demonstrates improved development efficiency and quality of m-learning applications. | Apply | Cognitive/Behavioural |
| S45 | Constructive Alignment | The study found out that students prefer formative feedback (without marks) in the beginning to help develop their understanding of unit concepts and encourage them to achieve learning outcomes. | Understand | Cognitive/Behavioural |
| S46 | Simulation based teaching strategy | Based on the framework of modelling, simulation, visualization, and analysis, this approach provides a disciplined strategy for creating, executing, presenting, and analysing meaningful test cases as a part of formal test plans which are based on sound methodology of controlled experiments using scientific method. The study also concludes that extensive outcomes from classroom deployments proved students benefit from this approach | Analyze | Cognitive/Behavioural |
| S47 | Virtual and augmented reality in architecture education | Aims to improve comprehension of complex software architectures and enhance student engagement through immersive learning experiences. | Understand | Cognitive |
| S48 | Agile Methodologies (Scrum) | Significant improvement in knowledge and confidence levels (e.g., confidence in microservices implementation increased to 4.5/5). Students developed industry-relevant skills in cloud-native, API-first, and microservices-based applications. | Apply | Cognitive/Motivational/Behavioural |
| S49, | Case- Based Learning  Problem based learning | Discussions and team exercise enable the leaners to learn from peer and apply what they learn. 79% of feedback comments were positive and students wanted more practical exposure and tool-based learning. | Apply | Cognitive/ Behavioural |
| S50, | Learning by Doing   Experiential learning | Students developed deeper material knowledge by working hands-on with shape grammars. (S50)  Increased confidence in problem-solving and structural evaluation. Improved spatial reasoning skills through form manipulation and assembly exercises. Better preparedness for computational design (CD) methodologies. | Apply  Apply | Cognitive/Motivational/Behavioural |
| S51 | Project based learning  Collaborative learning | Enhance students’ ability to apply concepts. Promote teamwork skills.   Promote teamwork skills | Apply   Apply | Cognitive / Behavioural/Motivational |
| S52 | Preparing Teaching Manuals    Architectural Kata Structure | Students gained proficiency in SOLID principles, architectural patterns, quality attributes, and decision-making. Increases students’ engagement during learning and assessment.  Increases students’ engagement during learning and assessment | Understand | Cognitive / Behaviour |
| S53 | Collaborative learning | Generated group work spirit. Learnt to understand inter-cultural differences. Improved communication and presentation styles. Exposure to different architectural systems and methods. Growth in leadership and team management. | Understand | Cognitive/Motivational/Behavioural |
| S54 | Experiential Learning | Ability to learn from others and compare different solutions to solve a concrete problem. Improved student understanding and positive sentiment. | Apply | Cognitive |
| S55 | Online Teaching | Online teaching proved effective for theoretical subjects.  Practical-based learning, especially design studios, struggled to achieve learning objectives. Increased digital adoption, but dissatisfaction with the current state of digital tools for architecture education. | Apply | Cognitive / Behavioral |
| S56 | Team Based Learning       Project-based Learning | The PBL/TBL approach improves both technical and interpersonal skills including technical language and vocabulary. And it improves the course attendance, peer learning without intervention of instructor and active participations. | Apply | Cognitive/Behavioural |
| S57 | Architectural Kata       Online Teaching | Students learnt to make decisions and do trade-offs in situations where business needs and quality requirements complete. They also learnt about prioritising non-functional requirements    Online teaching proved effective for theoretical subjects.  Practical-based learning, specially design studios, struggled to achieve learning objectives.  Increased digital adoption, but dissatisfaction with the current state of digital tools for architecture education. | Analyse       Understand | Cognitive / Behaviour |
| S58 | Collaborative Learning | Students successfully contribute to open-source projects and improved understanding of architectural concepts through practical experience. Developed technical and social skills required for software architects by putting theory to practice. Enhanced collaboration skills through group work and peer feedback. | Apply | Cognitive/behavioural /Motivational |
| S59 | Case-based Learning | Effectively bridges theoretical knowledge with real-world practice, enhancing analytical, technical, and communication skills. | Analyse | Cognitive/behavioural /Motivational |
| S60 | Flipped Classroom | The flipped-classroom approach shows positive outcomes with higher student satisfaction. | Understand | Cognitive/behavioural |
| S61 | Game-based Learning (Kahoot! DecidArch) | Enhanced reasoning skills. Greater appreciation for diverse solutions. Limited but notable awareness of architectural decision dynamics (LO3). | Evaluate | Cognitive |
| S62 | Flipped classroom approach | FC helped significantly in teaching and learning, that students actively participated in the classes, elaborated more relevant, important answers, proposed new ideas and solutions and developed critical thinking, which  contributed to learning. more solid. Students who participated in the experimental group achieved better results and proposed  more efficient solutions to the problems presented by the teacher. | Evaluate | Cognitive/Motivational/Behavioural |
| S63 | Interdisciplinary learning | N/A | N/A |  |
| S64 | Role-play learning | Increases student engagement, comprehension, and retention of software architecture concepts. | Understand | Cognitive |
| S65 | Open-Source Projects | Students not only learn the cutting-edge research and concerns in software architecture, but also apply the learnt  methods to their research works and have developed the ability of autonomous learning. They also improve their ability of software architecture analysis and design | Apply | Cognitive /Behavioural |
| S66 | Real clients or industry experts | N/A | N/A |  |
| S67 | Conferences featuring industry guests | Reported improved understanding, engagement, and collaboration through system design practice. | Understand | Cognitive/Behaviorual |
| S68 | Archinotes | Improved student understanding of quality requirements, better team coordination, and more effective architectural design and documentation | Understand | Cognitive/Behaviorual |
| S69 | Gamified architecture education | N/A | N/a |  |
| S70 | Case based learning | Improvement in learning outcomes through reduced task completion time and higher SUS scores. | Apply | Cognitive/Behavioural |
| S72 | Experimental learning | The outcome includes improved engagement, better comprehension of abstract concepts, and higher satisfaction from students. | Understand | Cognitive/Behavioural; |
| S75 | Project Based learning | Students produced functioning systems and demonstrated increased understanding of software architecture in embedded systems​ | Understand, | Cognitive/Behavioural |
| S77 | Gamified architecture education | Students reported improved understanding of utility trees, trade-offs, and negotiation. | Understand | Cognitive |
| S78 | Game based learning | Survey data shows improved learning outcomes in reasoning and reconsideration. Students better understand trade-offs and the need to revisit decisions. | Understand | Cognitive /Behavioural |
| S80 | Early design-centric education | Students showed improved understanding of design principles, better documentation, and enhanced terminology usage. Some developed an awareness of the importance of design over direct coding. | Understand, | Cognitive |
| S82 | Visualization and AR/VR tools | N/A | N/A | N/A |
| S83 | Platform based learning | Positive feedback from students: majority found the tool useful, easy to use, and aligned with real coding practice. Survey results showed increased willingness to use the tool and improved understanding of software architecture concepts. | Understand | Cognitive |