INTERNATIONAL JOURNAL OF MODERN TRENDS IN SOCIAL SCIENCES (IJMTSS)

LITERATURE REVIEW OF CONCEPT ATTAINMENT MODEL TECHNOLOGY: THE EFFECTIVENESS CONCEPT ATTAINMENT MODEL MIXED WITH OTHER MODEL IN COMPUTATION WORK

Sofian Rizal[1*], Basuki Wibawa[2], Ifik Lakswirinto Arifin[3], Ivan Hanafi[4], Teguh Trianung Djoko Susanto[5]

[1] Department of Teknologi Pendidikan, Universitas Negeri Jakarta, Indonesia, Department of Computation, Badan Riset dan Inovasi Nasional, Indonesia
Email: sofian.rizal@mhs.unj.ac.id, sofi003@brin.go.id

[2] Department of Teknologi Pendidikan, Universitas Negeri Jakarta, Indonesia
Email: bwibawa@unj.ac.id

[3] Inixindo Learning Center, Indonesia
Email: ifikarifin@inixindo.co.id

[4] Department of Teknologi Pendidikan, Universitas Negeri Jakarta, Indonesia
Email: ivan.hanavi@unj.ac.id

[5] Department of Teknologi Pendidikan, Universitas Negeri Jakarta, Indonesia
Email: teguhtrianungdjokos@unj.ac.id

* Corresponding Author

Article Info:

Abstract:

Concept attainment is an instructional strategy that uses a structured inquiry process. Students fail to grasp the certain concepts of subject, which lead disinterest among students. Moreover students are often unable to apply their knowledge to advance studies. In concept attainment, students figure out the attributes of a group or category that has been provided by the teacher. The purpose of this study is to determine the effect of applying the concept attainment model mix with other model on students critical thinking skill and the use of technology in teaching. The literature review method was used to collect and analyze the relevant literature in this field. The results of this literature review reveal that the concept attainment model mix with other model have proven effective in enhancing students understanding and practical skills and found there will be significant difference between the mean achievement scores of the science or social students taught. The strategy is based on the research investigated how different variables affected the concept learning process and the use of technology in teaching have proven effective in enhancing students understanding and practical skills. However, several challenges were also identified, such as the lack of adequate resources and

facilities, the need for increased training of lecturers, and adaptation to technological changes in the concept attainment model. Further research is needed to address this challenge and develop the concept attainment model that are more integrated and relevant to industry needs. By taking into account the findings of this literature review, it is hoped that the concept attainment model mix with other model on students critical thinking skill and the use of technology in teaching can be improved, so that students can acquire the knowledge and skills needed to be successful in the world of computaion work.

Keywords:

Concept Attainment, Model, Mix, Computation, Learning

Introduction

Along with the times, good education becomes the foundation in the development of a nation. Education should also develop according to developments and technological advances in order to produce professional human resources. One way to improve the understanding of learning material can be developed concept attainment learning models mixed with other learning models that can attract the attention and interest of students. The limited number of academics and practitioners who are experts in the knowledge and use of concept attainment learning model technology mixed with other learning models has resulted in slow adoption in the world of education. There are 3 main obstacles to the adoption of the concept attainment learning model mixed with other learning models, namely: (1) Lack of understanding of the concept attainment learning model mixed with other learning models and their benefits, (2) Lack of skill development of the concept attainment learning model mixed with other learning models, and (3) Lack of education and training (training) concept attainment learning models mixed with other learning models. These obstacles indicate the importance of improving education, the concept attainment learning model is mixed with other learning models through formal and non-formal education. In fact, universities are expected to produce experts in concept attainment learning models mixed with other learning models needed for computational work.

Concept attainment learning model education mixed with other learning models in higher education aims to produce graduates who are equipped with the achievement of theoretical concepts and practical achievements that are relevant to the needs of experts in the field of concept attainment learning models mixed with other learning models in computational work. Through education the concept attainment learning model mixed with other learning models, improving the quality of human resources and adopting the concept attainment learning model mixed with other learning models in computational work can be done to face the high global competition that exists. The importance of providing concept attainment learning model education mixed with other learning models indicates the challenge and need for the role of academics. It is necessary to study the perception of academics regarding the benefits and constraints of applying the concept attainment learning model mixed with other learning models first as a first step in preparing a concept attainment learning model mixed with other good learning models, because academics have a deep understanding of the potential and challenges involved when they want to adopt a concept attainment learning model mixed with other learning models.

Based on the latest research review, focusing on the following research questions: What are the views expressed by academics regarding the benefits and constraints of implementing the concept attainment learning model mixed with other learning models first as a first step in

preparing a concept attainment learning model mixed with other learning models. Through the perception of academics from various professions, diverse, thorough and valuable insights are obtained about how the concept attainment learning model is mixed with other learning models first as a first step in preparing a concept attainment learning model mixed with other learning models affecting the concept of how to work and the concept of computational work practice. As well as an overview of potential steps that can be taken to encourage the adoption of concept attainment learning models mixed with other learning models, both in practical concepts in computational work, and concepts academically through the implementation of concept attainment learning model education mixed with other learning models in universities.

Methodology
This research uses a qualitative approach with a literature study or literature review. The analysis is conducted descriptively and discussed thematically to identify the advantages, challenges, adoption, and opportunities of concept attainment learning models mixed with other future learning models in computational work. A full text evaluation is carried out to categorize the collected articles. If the article includes some topics, this article uses only the main focus for classification. The main focus is identified by reading the specific objectives stated in the article. The literature sources used are articles from various learning models.

Result and Discussion
The following 30 literature sources are used to analyze the concept attainment learning model mixed with other learning models regarding challenges and opportunities.

Table 1: Results Of Literature Study Advantages, Obstacles, Opportunities The Concept Attainment Learning Model Is Mixed With Other Learning Models In The Future

No. Heading	Reference	Discussion
(1) Effectiveness and experiences of team-based learning in nurse education programs: a mixed methods systematic review protocol	(Dave Sookhoo, Chris Thurston, 2018)	The review focused on application exercises, an important part of the TBL activities, and confined itself to reporting on the use of specific tools, concept mapping and case study as strategies to facilitate learning.
(2) Rethinking Teaching Team- Based Learning: The Challenges and Strategies for Medical Education in a Pandemic	(Yun Li, Nicholas A. Sears, Ian V. J. Murray, Kamlesh K. Yadav, 2021)	To help students achieve this learning goal, an interdisciplinary group of engineering, basic science, and clinician–educators develop strategies to blend engineering concepts into the medical curriculum.
(3) The effect of team-based learning on content knowledge: A meta-analysis	(Elizabeth Swanson, Lisa V McCulley, David J Osman, Nancy Scammacca	Following the readiness assurance process, students then participate in knowledge concept application based activities that allow the

	Lewis, Michael Solis, 2019)	teams to use knowledge to address significant, real world problems.
(4) THEMATIC APPROACH -A NEW PERSPECTIVE IN TEACHING	(G. Saraswathi, Leo Stanly, 2018)	A thematic approach allows teachers to put whatever concept they are teaching into a perspective that might be more easily understood by students or framed around a problem.
(5) The effect of thematic learning model, learning style, and reading ability on the students' learning outcomes	(L. Nurlaela, M. Samani, I. G. P. Asto, S. C. Wibawa, 2018)	Concept mapping and visual representations help learners think about a subject globally and allow flexibility in their thinking. The student books provided in this study was a material which was feasible to qualify, because it presented the concept and the structure and activities that the students had been identified.
(6) Development of Integrated Thematic	(Risda Amini, Sry Eka Handayani,	The main problem is the inappropriate current practice of learning process with teaching materials. This problem gives an impact on the achievement of concept objectives as it should be.
Teaching Materials using Problem Based Learning Model in Elementary School	Yanti Fitria, Sri May Lena, Yullys Helsa, 2019)	The development of teaching materials is needed to overcome these problems by considering appropriate concept attainment model so that the expected goals will be achieved.
(7) Inquiry-based Integrated Thematic Instruction On Character Education Of Primary School Students	(Chumdari, Sri Anitah, Budiyono, Nunuk Suryani, 2018)	The characteristics the combination of inquiry strategy and thematic learning include: 1). Child-centered, 2). Direct experiences, 3). Ambiguous distinction of subject matters, 4). Concepts from various subject matters, 5). Flexible, 6). Learning outcomes adjusted to students' interests and needs, 7). Principle of fun learning while playing, 8). Students' active and creative involvement, 9). Self-study skill improvement, 10). Constructive theory, 11). Intellectual ability improvement.
	(Shenglei Dai, 2019)	

(8) ARS Interactive Teaching Mode for Financial Accounting Course based on Smart Classroom		Smartness of Smart Classroom involves optimal presentation of teaching content, convenient acquisition of learning resources, deep interaction of classroom teaching, context awareness and test, classroom layout, and electric management can be summarized into five dimensions, as follows: Showing, Manageable, Accessible, Real time Interactive and Testing (SMART). The five dimensions embody the features of Smart Classroom, called SMART conceptual model.
(9) HAVE A DIFFERENT CONCEPT: HOW TO DESIGN MOBILE GAME-BASED INTEGRATED THEMATIC LEARNING FOR ELEMENTARY SCHOOL STUDENTS?	(Rifda Eliyasni, M. Habibi, Nurfaijah, Tiok Wijanarko, 2024)	The MGBITL application has been design which consists of 21 types of games adapted from Class V Theme 8 Subtheme 1 material which is the result of research activities. The introduction of MGBITL will aid teachers in teaching materials that need imagination, make subject matter easier to understand, and promote fun learning concepts. Students are unaware participating in a learning activity.
(10) Smart learning environments: a basic research towards the definition of a practical model	(Pedro Antonio García-Tudela, Paz Prendes-Espinosa, Isabel María Solano-Fernández, 2021)	The changes can be summarized in change of terms use Smart or enriched in certain dimensions, use of the concept smart education or smart pedagogy which have been substituted by enriched methodologies and strategies. Some indicators have been integrated in other dimensions especially those related to instructional design. Some concepts have been specified with more precision. Educational agents, roles or Smart technology, should not be mistaken for artificial intelligence.
(11) Artificial Intelligence in Education: A Review	(LIJIA CHEN, PINGPING CHEN, ZHIJIAN LIN, 2020)	The concept of learning analytics introduces new technology, machine learning, being applied to a non-technical world as

		education. The purpose is to tailor educational method to the individual learner need and ability, such as intervening with students at risk or providing feedback and instructional content. It uses techniques related to machine learning, data visualization, learning sciences, and semantics.
(12) The Nature and Organization of Individual Differences in Executive Functions: Four General Conclusions	(Akira Miyake, Naomi P. Friedman, 2012)	Self restraint was assessed with a prohibition task which a child was shown an attractive toy and told not to touch it for 30 seconds, a task that has conceptual similarities to the well known delay of gratification tasks and requires active goal maintenance.
(13) Cognitive and behavioural flexibility: neural mechanisms and clinical considerations	(Lucina Q. Uddin, 2021)	Flexible thinking is a critical component of creativity or ability to think of new ideas or make new things. Flexibility and creativity have not historically been studied in tandem despite the obvious parallels between the constructs. While cognitive flexibility is conceptualized as an aspect of executive function and is associated with a rich human neuroimaging literature, creativity has only recently become the topic of cognitive neuroscientific investigations.
(14) Cognitive Flexibility	(José J. Cañas, Inmaculada Fajardo, Ladislao Salmerón, 2006)	This definition involves three important concept characteristics. Cognitive Flexibility is an ability which could imply a process of learning it could be acquired with experience. Cognitive Flexibility involves the adaptation of cognitive processing strategies. A strategy in the context of this definition is a sequence of operations which search through a problem space. Cognitive flexibility refers to changes in complex behaviors and not in discrete responses. The adaptation occur to new and unexpected

		environmental changes after a person has been performing a task.
(15) Individual differences in susceptibility to online influence: A theoretical review	(Emma J. Williams, Amy Beardmore, Adam N. Joinson, 2017)	Cognition and Automaticity Model attempts to combine concepts related to individual differences in knowledge and cyber risk related to habitual and routine behaviours when considering evaluations of phishing e-mails. Its present state does not currently account for how these concepts may interact with influence techniques or the range of individual factors that may influence susceptibility.
(16) Why do people file share unlawfully? A systematic review, meta-analysis and panel study	(Piers Fleming, Steven J. Watson, Elisavet Patouris, Kimberley J. Bartholomew, Daniel J. Zizzo, 2017)	Selected the media of music and eBooks to provide conceptual breadth there are clear limits to generalizing to other media types. The effect of PBC was similar for both students and younger participants; examining the similarities and differences between these groups could provide greater insight into the exact mechanisms that contribute to the differences with older, non-student samples.
(17) Expansive Learning at Work: toward an activity theoretical reconceptualization	(YRJO¨ ENGESTRO¨M, 2001)	To make analytical sense of the situation, need to look at the recent history of the activity systems involved. In municipal primary care health centers, multi-professional teams have effectively increased the continuity of care, replacing the isolated visit with the long-term care relationship as the object of the practitioners' work activity. The notion of care relationship has gradually become the key conceptual tool for planning and recording work in health centers
(18) Disruptive Technologies - A promising key for Sustainable Future Education	(S.Gejendhiran, S.Arokia Anicia, S.Vignesh, M.Kalaimani, 2019)	Learners can get the possibility to understand the concepts better thanks to the use of 3D models. Augmented Reality (AR) allows adding a new layer of information

(19) CHILDREN'S COMPUTER CLUB AS AN EXAMPLE OF NON-FORMAL EDUCATIONAL SYSTEM IN THE FIELD OF INFORMATICS	(Vladimir A. Lokalov, 2014)	to physical reality using a Smartphone or tablet. Using disruptive technology, teachers can provide attractive presentations that will attract students attention even in the case of an uninteresting topic. Development of learning task complication principles is an essential part of designing educational system and provides its conceptual unity and adaptive capabilities as well. The idea of gradual specialization in process of vocational training is well known in vocational education. The traditional model of gradual specialization consisting of 3 training levels: 1) primary, 2) basic, 3) advanced - was taken as a basis of CCCP educational system concept. Each level is characterized by the degree of specialization as well as special principles of learning task system development which result in forming generalized actions.
(20) Gamification Elements in Quizizz Applications: Evaluating the Impact on Intrinsic and Extrinsic Student's Motivation	(N Razali, N A Nasir, M E Ismail, N M Sari, K M Salleh, 2020)	The effectiveness of gamification usage toward the students intrinsic motivation. This study has chosen The Quizizz application as the platform in identifying students learning motivation through this approach. The Quizizz application is an educational application using the concepts of the learning based game designed in the form of online games for teaching and learning in class. These are the five elements of mechanics focused on the Quizizz application including points, level of difficulty, reward and avatar.
(21) The Gamification of Learning: a Meta-analysis	(Michael Sailer & Lisa Homner, 2020)	The significant results in the analyses of the conceptual moderators were mostly found for behavioral learning outcomes is of particular interest for future

		investigations. The transparent reporting of study characteristics, control group arrangements, and combinations of learning processes and learning outcome data as well as investigating several outcome types in single studies would provide a more comprehensive (meta-analytic) investigation of the factors that contribute to the effectiveness of gamification.
(22) Exploring Students' Use of a Mobile Application to Support Their Self-Regulated Learning Processes	(Martine Baars, Sanyogita Khare, Léonie Ridderstap, 2022)	The strategies students utilized when studying in general, students commonly used summarizing, note-taking, organize and elaborating, and self-explaining in the self-study app. Some students tried concept mapping. This strategy suited a student with visual memory but did not suit another student style, who used clear writing goals instead. However, once students learned how to use a strategy provided by the study app, they no longer found it necessary to use the app to continue utilizing that strategy. This indicates reduced benefit of the app once the desired strategy is learned.
(23) Computer Network Learning Strategy In The Revolution 4.0 Era With The Waterfall Method	(Basuki Wibawa, Suyitno Muslim, Sulfikar Sallu, 2020)	The method used is combining 14 (fourteen) learning models, namely the global method, the lecture plus method, debate, thought concept mapping, problem-solving methods, design methods, experimental methods, methods skills training, demonstration method, lecture visit method, discussion method, recitation method, scripts cooperative, discovery method, inquiry method, peer teaching method and team teaching method with using the blended learning model. The result to be achieved is to produce a strategy guide for computer network courses to be

(24) The Impact of Modern Technology in the Teaching and Learning Process	(Siyamoy Ghory, Hamayoon Ghafory, 2021)	used as reference material in the curriculum courses. The objective of technology in a typical educational environment is to enhance the education of knowledge and skills via enhanced efficiency and effectiveness. To conduct a thorough examination of this concept must first define a few concepts. The phrase efficiency refers to the rate at which humans acquire knowledge, whereas the term effectiveness refers to the quantity of given knowledge that is operationally learned. When technology is used directly to a learning environment, such as a school, both students and teachers can be considered as learners.
(25) Integrated STEM Approaches and Associated Outcomes of K-12 Student Learning: A Systematic Review	(Hong Chung Le, Van Hanh Nguyen, Tien Long Nguyen, 2023)	Synchronization-based integrated (STEM) approach teachers identify common knowledge and skills in two or more subjects, and teach those subjects separately but create knowledge connections to reinforce these concepts. Integrated STEM approaches also often involve hands-on learning experiences through experiments, projects, and other interactive activities. This type of learning can be more motivating than simply reading about a concept in a textbook. Collaboration and teamwork in STEM activities can be motivating for students who enjoy working with others and obtain a sense of accomplishment by contributing to a group effort.
(26) THE IMPLEMENTATION OF INTERACTIVE MULTIMEDIA IN IMPROVING MATHEMATICS LEARNING OUTCOMES	(Nurmawati, Lusi Rachmiazasi Masduki, Edy Prayitno, Maria Yustina Rensi Dartani, 2020)	The concept of multimedia captures these many ways video, still images, text and sound in which words, pictures and numbers can be delivered for the purpose of assigning meaning. These tools assist the learning of new knowledge much more effectively. Direct mathematical

		objects include mathematical facts, math skills, mathematical concepts, and mathematical principles, while indirect mathematical objects include the ability to think logically, the ability to solve problems, the ability to think analytically and positive attitudes toward mathematics.
(27) Teaching occupational health and safety in engineering using active learning: A systematic review	(Italo Rodeghiero Neto, Fernando Gonçalves Amaral, 2023)	It is explained by the absence, in the literature, of systematic reviews that discuss concepts of Active Learning and OHS, contributing to the academic field regarding the real situation of the combination of these fields. This study aims to answer the research questions (i) What active learning strategies are utilized in the fields related to OHS in the engineering specialties? (ii) What are the advantages and disadvantages of using each strategy? (iii) What competencies are the students developing based on these strategies?
(28) How are feelings of difficulty and familiarity linked to learning behaviors and gains in a complex science learning task?	(Yingbin Zhang, Luc Paquette, Ryan S. Baker, Nigel Bosch, Jaclyn Ocumpaugh, Gautam Biswas, 2022)	The inconsistent findings raise the question about how the overall FOF toward a task is related to FOF toward subtasks, as well as how they are differentially related to learning behaviors and gains. In Betty's Brain, further research may examine the association between FOF toward single concepts and the overall FOF as well as the difference between the average FOF toward single concepts and the overall FOF. The difference in the associations between various FOF and learning is critical because of practical implications. If FOF specific toward the material can facilitate learning, teachers may need to demonstrate the link between learning material and

		students experiences as concretely as possible.
(29) Effects of exergames on student physical education learning in the context of the artificial intelligence era: a meta-analysis.	(Zhao, M., Lu, X., Zhang, Q., Zhao, R., Wu, B., Huang, S., & Li, S., 2024)	The following aspects (1) Exergames are characterized by entertainment, flexibility, and competition. Learning in the game students can improve their participation and interest in learning motivating them to study actively. Students gain a sense of accomplishment in completing the game tasks further improving their self-confidence in learning. (2) Exergames can provide a relaxing and enjoyable learning environment. Students can perform multiple and repeated simulation exercises in this environment creating a stronger sense of actual participation and experience fully feeling the pleasure and charm of sports. The learning environment created by games allows students to establish a general perception of learning from technical movements. (3) Children and adolescents begin interacting with technical devices at an early age and are immensely obsessed with virtual games. In conclusion, exergames are in line with the modern concept of education aiming at the development of students and the improvement of health quality and social adaptability.
(30) Development of an Instructional System Design Model as a Guideline for Lecturers in Creating a Course Using Blended Learning Approach	(Uwes Anis Chaeruman, Basuki Wibawa, Zulfiati Syahrial, 2020)	The conceptual framework and definition of blended learning explained has developed an ISD model named PEDATI. PEDATI stands for pembelajaran daring di perguruan tinggi (online learning in higher education). The term PEDATI refers to the ISD model developed in this study. PEDATI has four steps: 1) formulating course learning outcomes, 2) mapping and organizing content, 3) determining appropriate

learning activities, 4) designing
synchronous and designing
asynchronous learning activities.

Example for table 1 number 1, Students actively engaging in activities such as reading, communicating their ideas with others, sharing their knowledge, reasoning and thinking critically about the knowledge content, and participating in classroom activities to seek answers to problems are but only a few examples of what may be considered outcomes of active learning. Example for table 1 number 2, the TBL activities are especially useful for this integration of engineering and medicine in the preclerkship courses. The respiratory physiology TBL activities include hands-on use and development of devices such as spirometers, ventilators, and pulse oximeters used to diagnose, and monitor patients with respiratory ailments. In this way, the EnMed TBL facilitates the application of specific skills, deeper learning, and interprofessional education. Example for table 1 number 3, TBL is the co-construction of meaning through group discourse. By engaging in discussion with one another, students provide and receive immediate feedback about their understanding of ideas. It is possible that smaller groups can more efficiently share ideas and better communicate to co-construct meaning. Smaller groups may also compel students to participate more fully, speak more often, and exhibit more effort on difficult tasks, making "social loafing" less likely.

Example for table 1 number 4 when using thematic instruction, teachers plan multiple opportunities for children to build on what they already know and to extend learning with meaningful, connected activities throughout the day. A theme on bridges may include the following kinds of activities. Bridges are constructed and explored in the block area and at the water table while outside in the play yard there are materials for building bridges. Example for table 1 number 5, the thematic learning is more accommodating to differences in students' reading ability because it provides the conditions that encourage students to develop the ability to read. This learning makes students active and engaged no matter how their reading ability is. This leads to students' increased interest in reading thus leading to increasing reading skills. There is a relationship between reading and reading skills. The higher interest in reading is the better a person's ability to read. In the thematic learning, learning strategies lead to increased students' interest in reading which will then lead to increased reading ability and ultimately lead to better learning outcomes.

Example for table 1 number 6, the integrated thematic teaching materials based on the PBL model are very effective to be used in the learning process. The development of these materials can be done by every teacher using practicality, validity and the effectivity criteria in order to determine the quality of teaching materials. Thus the teaching materials developed will be in accordance with the expected results and the right targets according to the actual educational objectives. The teachers' creativity is indispensable in choosing and utilizing existing learning resources and adapted to the methods and strategies of school learning. Example for table 1 number 7, The theoretical implication of this study is to enhance the discourse in the methodology of instructional in particular and the science of education in general. The practical implication of this study is to provide empirical evidence of the effectiveness of inquiry-based integrated thematic model and an alternative for effective learning to attain character education learning outcomes, as well as the aspects of knowledge and skills.

Example for table 1 number 8, Financial accounting course is used as the example in this study to construct ARS interactive teaching mode based on Smart Classroom for financial accounting course during which multiple construction approaches were adopted mainly including theory deduction method and induction method. The qualitative method was used for modeling. Document research, classroom observation, case analysis, and investigation were combined. Example for table 1 number 9, The story "The Ant and the Bear" was given to students in nine pieces. Then there are nine blank squares where the story pieces might be placed. In order to build the right story line, students place each story piece in the box. After correctly assembling the story, nine pieces of artwork appear, each depicting the contents of one of the story pieces. Each picture is placed in the appropriate story piece by the students. Example for table 1 number 10, in the case of the component learning path since it is considered part of smart learning. The design of different learning alternatives must be based on educational theories that belong to the smart pedagogy dimension. Pedagogy includes the teaching learning process therefore it is risky to create two dimensions. The graphical representation should be different to appreciate the closer component relationships. The concepts presentation, intervention and teaching management can pose difficulties of application if they are not studied in depth.

Example for table 1 number 11, an application such as Knewton makes real-time recommendations for students premised on deciphered learning style as adduced by the technology using machine learning algorithms and subsequently customizes course materials or content to the learners' needs. Example for table 1 number 12, in this ongoing work to simulate individual differences in hypothesized common EF mechanisms of actively maintaining goals and thereby biasing lower level processing manipulated parameters that influence the strength of representations in the prefrontal-cortex layer of the model and how strongly the prefrontal cortex connects with posterior areas. Consistent with hypothesis that goal maintenance is important for all EFs, these manipulations affected all the modeled tasks. Example for table 1 number 13, working memory training can improve working memory performance but not inhibitory processing or other skills. Implementing a gamebased flexibility training designed to increase motivation in children, one study found long term transfer effects in untrained executive control tasks.

Example for table 1 number 14, in an eventrelated fMRI study, it has been demonstrated that when individuals with Asperger's Syndrome who may have a dysfunction of the medial frontal gyrus and the superior parietal lobe areas perform cognitive flexibility tasks (tasks of set-shifting), they show significantly more activation in those areas. Example for table 1 number 15, an employee with a high need for affiliation may prioritise maintaining harmonious relational ties within the workplace. Scenarios whereby they are fatigued or cognitively overloaded combined with occupying a position of relatively low power or status within the organisation may make them particularly susceptible to influence attempts that exploit reciprocity, authority or conformity. Example for table 1 number 16, for music downloading which has a long history, PBC is a key determinant of reported behavior. In contrast Subjective Norms principally determine reported engagement in the relatively new phenomenon of eBook downloading. In terms of the TPB, this means that higher past experience implies an increased awareness of what is likely to happen in the future as well as increased contemplation of the behavior and its consequences. This has also wider implications for our understanding of how decision making occurs in behavioral contexts that are characterized by past experience.

Example for table 1 number 17, the construction of the concept of care agreement with the related concepts of care responsibility negotiation and knotworking by the participants of the

Boundary Crossing Laboratory is a useful example of developmentally significant sideways learning. Classic work on concept formation, Vygotsky basically presented the process as a creative meeting between everyday concepts growing upward and scientific concepts growing downward. While this view opened up a tremendously fertile field of inquiry into the interplay between different types of concepts in learning, it did retain and reproduce the basic singular directionality of vertical movement. Example for table 1 number 18, applying modern disruptive technologies in education can achieve the following benefits like efficient recording and sharing of educational materials, personalized learning, automated student data management, efficient analytics and reporting, more profound progress evaluation. Example for table 1 number 19, practical implementation of three-level non-formal educational system in informatics with the help of which lessons in CCCP were organized (Children's Computer Club of St. Petersburg 2014) is given. It uses modular approach in order to provide freedom in educational direction. Module is an independent structure and therefore is characterized by its purpose and objectives. It allows to consider a course as a module. In order to combine it with other modules in week curriculum as well as extra-curriculum activities not connected with non-formal educational system it was decided to conduct classes once a week during 32 studying weeks. Duration of one lesson is 3 academic hours which makes 96 hours of the whole module course. The main criterion of enrolling students is their interest and self-esteem. When studying a student can change the course. Enrollment peculiarities, dynamic structure of a group result in age and level diversity within the group. The following ways help deal with these difficulties, flexibility of curriculum, individual work of a teacher or an assistant with learners and individual oriented tutorials.

Example for table 1 number 20, element in gamification is among the most influenced component to the students' motivation. The findings also revealed that all the gamification mechanics of *points*, *reward*, *level of difficulty* and *avatar*, used in this study are significant in the relationship with students' intrinsic and extrinsic motivation. The predictors of *points* has proven on its existence will increase in the students' intrinsic motivation along with the teaching and learning through the Quizizz application. The predictors of *points*, *level of difficulty*, and *avatar* has proven on its existence will increase in the students' extrinsic motivation along with the teaching and learning through the Quizizz application. Example for table 1 number 21, introducing a fictional game world which is relevant throughout the gamified intervention, combined with an avatar system, which allows for developing an avatar over time, can help to foster learners' skills. Creating a gamification environment that allows learners to engage in both competitive and collaborative interaction can be beneficial, letting learners work together in teams while competing with other teams can help to improve learners' quality of performance and skills. There is evidence from the subsplit analysis of studies using high methodological rigor that this also holds true for motivational learning outcomes. Example for table 1 number 22, mathematics is studied in a completely different way than biology. The absence of time pressure would also motivate students to attempt new strategies. Regarding the strategies provided by the app, students often found them too time consuming to learn. Taken together with the time pressure that most students felt the strategies provided in the app were perceived as inefficient. According to the students a thorough explanation of the strategies provided by the course instructors would have contributed to efficiently learning the study app strategies. Other suggested motivators include discussing study strategies with peers to understand what works for others.

Example for table 1 number 23, The combination of these methods can be used as a basis in the computer network learning model because it will produce students who are competent and

ready to take international certification exams in the field of computer networking. Example for table 1 number 24, It increases pupils' motivation to learn, provide students with hectic schedules with the opportunity to work from home on their own timetable, teach pupils new digital abilities that they may apply in the workplace afterwards, reduce paper and photocopying expenses by supporting the green revolution idea. Example for table 1 number 25, The findings of the study revealed that no divergence was observed in ecological sentences. Student learning outcomes occurred consistently within the same STEM activity. The associated outcomes of K-12 student learning differed among the integrated STEM approaches. The synchronization based integrated STEM approach encompassed a wide range of integrated STEM activities applied to the science curriculum resulting in different learning outcomes for students. The thematic based integrated STEM approach showed the most prominent relationship between engineering design based STEM activities in the science curriculum and the associated learning achievements of elementary and middle school students. In the project-based integrated STEM approach STEM project based learning activities in the science curriculum focused on improving students' learning achievements and higher order thinking skills while out of school STEM project based learning activities focused solely on students' STEM career interests. In the cross curricular based integrated STEM approach students' learning achievements were absent from the integrated STEM activities.

Example for table 1 number 26, learning media is something that can be used in transmitting learning messages it is done so that it can stimulate the attention and thoughts of participants. The learning system does not always have to be done conventionally but can be done in a more modern efficient and effective way. The uses of interactive multimedia in teaching mathematics indeed give great impacts to the students'understanding of mathematics. The experimental group showed an improvement in performance and this improvement was statistically significant since the students got better achievement in their mathematics understanding by using interactive multimedia based learning media. Example for table 1 number 27, from the studies analyzed it was possible to identify and discuss the active learning most utilized in OHS seeking to show evidence of its main characteristics, definitions and limitations give teachers and researchers a glimpse of many other active learning strategies. Example for table 1 number 28, guiding students to set realistic goals may decrease FOD. In Betty's Brain this may be achieved by supporting students in decomposing the map building task into small subtasks. This study's findings support the notion that learning material should be linked to students' prior experiences. FOF was not related to any learning behavior metric but it moderated the relationship between FOD and learning gains. Where students lack relevant experiences, teachers may use educational technologies such as computer based simulations to familiarize students with the topic before studying the exact content. Some unfamiliarity can be helpful.

Example for table 1 number 29, in terms of specific learning effects, exergames significantly promote the cognitive and non cognitive abilities of students. Researchers argued that intrinsic motivation arises from the natural interest of humans in activities that offer novelty, surprise, curiosity or challenge. When engaging in such activities, the brain can feel dynamic pleasure, excitement or gratification, prompting attention to be focused on the process (e.g., learning about unknown knowledge, mastering new skills, etc.) rather than on external signals of reward or punishment. Just as playing is a child's innate talent, exergames provide a platform for students to fully express themselves. Students can boldly present themselves and strong intrinsic motivation drives them to be more actively involved in PE class. Rewards for success in the game encourage students to feel pride and satisfaction and gradually enhance their self confidence and self identity leading to a positive learning attitude increased frequency of

practice, and continuous improvement of skills during the course. Example for table 1 number 30, PEDATI provide interrelated components or procedures. PEDATI and its components were feasible and usable. PEDATI and its components were relevant to the learning theories and e-learning concepts, provide a framework, systematic, systemic, easy to follow and provide practical guideline for the users. The study result showed that lecturer's ability in designing a course using PEDATI improved. PEDATI can be utilized as a guideline for lecturers in designing good quality of a courses using the blended learning approach.

From table 1 it can be that the results of the literature review of the concept attainment learning model mixed with other future learning models in computational work are still very little developed. Therefore, another article is included related to the development of learning models for concept attainment concepts mixed with other learning models in computational work.

Conclusion

Through a literature review, it was found that the development of learning modules, the attainment of concepts mixed with other learning models is still little applied in computational work. It is necessary to develop a learning model of concept attainment mixed with other learning models that are in accordance with computational work in learning so that learning can be more effective.

Acknowledgement

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