EFFECTIVE INNOVATIONUSING SCRUM FRAMEWORK FOR MEDIA ELEARNING AS MEDIA INTERACTIVE SYSTEM

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Abstract:

Learning is an innovation from the industrial era 4.0 where learning is done online, e-learning is not a new thing. But the problem is there are still very few people who talk about how to manage an e-learning project this goes well and smoothly, the purpose of this writing is to designhow to manage e-learning projects using the agile scrum method. and the results becomes more effective. The advantage of using the found When applying this agile approach to eLearning project management.Agile management through this scrum method almost forces participants or clients to increase their participation in eLearning.

Keywords: E-Learning, Media, SCRUM

INTRODUCTION

E-learning With the expanding advancement of innovation, the requirement for an idea with an IT-based getting the hang of/showing system can't stay away from. The result of the interaction of changing regular education into an advanced structure, both in content and framework, was known as e-learning at the time. [1]By planning this E-Learning application, it covers the requirements of clients to assist with working with the drawn-out educating and learning measure for understudies and instructors. The plan of this E-Learning application utilizes the Scrum strategy since Scrum makes work cleaner where the item proprietor or customer makes a focused list of things to get called the Product Backlog. Scrum is unique concerning customary SDLCs like Waterfall, the distinction can be found as far as appropriation rules, gatherings that are held just as how the application advancement measure happens. In Scrum, the Development interaction of a framework isn't equivalent to that completed by customary Frameworks, for example, Waterfall where each cycle will be reliant upon different cycles so that if there are measures that are hampered it will be exceptionally problematic and can prompt undertaking disappointment. This Scrum strategy utilizes the standards of the Agile methodology, which depends on the strength of group coordinated effort, Incremental Product, and Iteration cycles to understand the eventual outcome that is relied upon to speed up and adaptability in the application plan.[2]

Scrum is a spry structure that underlines programming improvement. It is intended for an improvement group (Three to nine individuals) that tackle issues as an activity timeboxed writing [3]. It will in general be contemplated that the arrangement of using Scrum design to encourage the thing is versatile and far-reaching, as the group has a similar target, disregard the conventional methodology, arrangement in item improvement [4].

The use of the Scrum methodology in the development of a flexible application requires some additional involvement in the execution stage, such as deciding on a need. ; it must be led since Scrum doesn't cover the entire item advancement cycle and it has a crossover viewpoint[5].In creating learning applications that embrace Scrum as structures there are significant things that should be claimed, like full clocks and communitarian group, a particular ability group, an exact arrangement, an everyday assessment, an ideal collaboration between groups in "run", and for detail assessment [6].By utilizing Scrum the improvement of portable applications can be accomplished effectivelyScrum is potentially the most well known of the flexible strategies and is an action model of adventure the board since it demonstrates an action that is performed iteratively until a business person broadcasts the yield all out. Scrum depends in little gatherings of specialists who self-regulate and figure out themselves using the cycles supported by Scrum.

This technique picked due to the rapidly and light in the improvement of the application and needed to create efficiency and exercises that merited the high. There are three a job in the advancement of the SCRUM, in particular the proprietor of the item, the SCRUM Master, and the engineer. The proprietor of the items will characterize the requirements of what is expected to maintain a business, then, at that point of the should be in change became one of the item accumulation that is worked with by an expert of the

SCRUM, then, at that point the item overabundance this will changed once more into the run overabundance that will be created by the engineer. During the execution of this prerequisite can change whenever and adaptable with the results of advancement will be disturbed.

The accessories learn and take a gander at these characteristics, as in a little while as they are united into self-association. Thing Proprietor, Scrum Master and Development assistants are basically occupations in Scrum that grasps, executes and administers self-association all through the Sprint as they are seen as cross obliging and having all essential capacities to achieve the run objective. The main events portrayed in Scrum are Sprint, Sprint Planning, Daily Scrum, Run Review and Sprint Retrospective, as life cycle events of a Scrum for a singular Sprint. Thing Backlog, Sprint Build-up and Increment are relics of Scrum, coordinated s a base of impression of regions, qualities, occupations and events of the Scrum.

LITERATURE REVIEW

The Scrum is perhaps most famous deft approach. It's anything but's a flexible, iterative, speedy, versatile, and convincing methodology planned to pass on basic worth quickly and across projects. Scrum ensures straightforwardness in correspondence and builds up an environment of total duty and diligent headway. The scrum system, as characterized in the SBOK™ Guide, is organized so that it upholds the improvement of items and administrations in a wide range of enterprises and each sort of task[7].
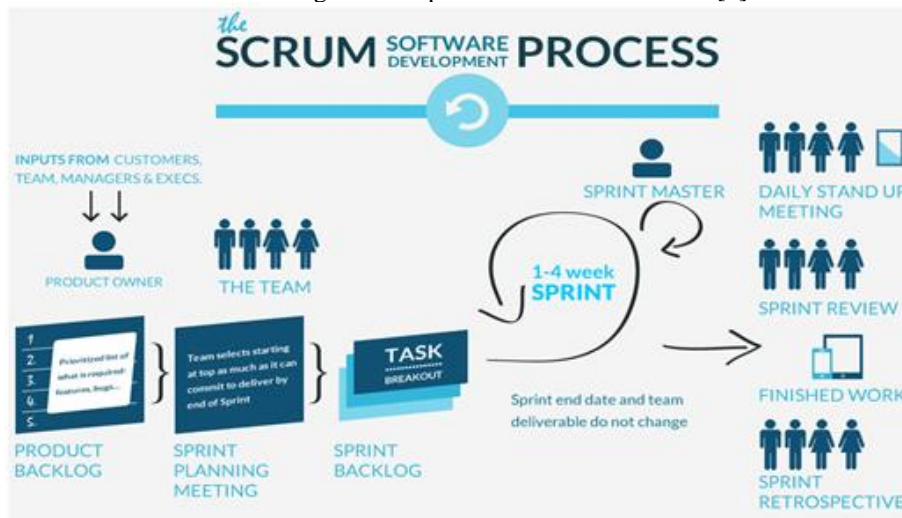

Figure 1 SCRUM Method

SCRUM:

a. Product Backlog

The venture proprietor orders and gathers all framework solicitations and prerequisites, for instance, required highlights or framework non-utilitarian necessities. After the objectives have been set, every one of the solicitations and requirements is separated into little parts where every little part should have esteem and have the right to be created.

The task proprietor additionally decides they need scale in dealing with these little parts. How and what are the little parts executed and conveyed like? These inquiries will deliver a plan for the day dependent on market needs and client needs that consistently change over the long run.

b. Backlog Refinement

The build-up should be appropriately and suitably kept up with by the Scrum Team for arranging, so the Sprint can run as planned. Things that should be done in keeping up with the build-up incorporate the assessment cycle and breakdown of necessities. This is done as such that the Sprint conditions (1 a month) are met.

c. Prioritized Product Backlog

The task proprietor incorporates and gathers all framework solicitations and necessities, like required highlights and additionally non-useful prerequisites of the framework. After the destinations have been resolved, every one of the solicitations and necessities is isolated into little parts where every little part should have esteem and have the right to be created.

d. Sprint

Sprint is a time box that contains work periods in which the sprint focuses on product delivery based on items selected from the Product Backlog.

2509

e. **Daily Sprint**

Every day, the scrum group should hold a gathering (meeting) for a limit of 15 minutes. This is the finished intent of synchronizing progress, recognizing issues, and settling existing issues in managing their job.

f. **Sprint Review**

Each run consistently finishes with exhibiting and introducing the highlights that have been chipped away at. This is done to guarantee that these highlights can work appropriately.

g. **Sprint Restprective**

In the Sprint Retrospective, the scrum group thinks about the work in progress in the past Sprint. The assumption to be accomplished in the Sprint Retrospective is that there are remedial activities so the following Sprint can be done far superior. These enhancements should be executed in the following Sprint.

A push to fuse Capability Maturity Model Integration methodology with the quick procedure to expand the company execution has been fueled by a programming upgrade association. This investigation uses a better approach to manage the map between the new type of Capability Maturity Model Integration 1.3 and Scrum. This aide has been examined, upgraded, and applied in a comparative association. The delayed consequence of the investigation demonstrates the efficacy of this strategy37% satisfaction and 17% inadequate satisfaction for Capability Maturity Model Integration express practice. This resembles an increase of19.4% satisfaction and 6.2% deficient satisfaction contrast and other related studies that do not make advantage of the new type of Capability Maturity Model Integration [8].

The utilization of quick techniques to development in general programming affiliation has been besides application-driven this is shown by exploring the speedy strategy in fourty relationships. The Scrum is really applied to accomplish for video visits and web camera for a bit by bit scrum meeting with synchronized a month run and bit by bit scrum of the scrum. The show of deft strategy to assist with spreading task is first thing perceived by seeing regularly visit, loosened up collecting, and yearly gathering [9].

The agile mix model was facilitated in an endeavor by utilizing scrum and element driven new turn of events . Scrum and FDD are two authoritative undertaking methods that capitalize on their benefits and pesters. Scrum seriously deals with the arrangement and FDD revolves around the Scrum and element driven new advancement were utilized to organize the deft mix model inside a venture (FDD). Scrum and FDD are two task the board systems that capitalize on their advantages and disadvantages. Scrum centers around the possibility of an endeavor or errand, while FDD centers around the possibility of an undertaking. A bank space project that coordinates enormous volume and information exchanging shows that this blend produces a 10% increment in quality and customer faithfulness. e thought of undertaking or errand. A bank space project which joins huge volume and information career expos that this mix accomplishes 10% more skilled in quality and customer steadfastness [10].

Scrum procedure has furthermore been adequately applied in the space of bearing explicitly in division experience of web learning region obvious level planning. The electronic learning a few important results for understudies like extended learning, obligation, upkeep, and lower peril of division and leaving school. The scattered Scrum has been concentrated to help encouraging a web learning region on understudy perspectives including the effects and the plans. Understudy snippets of data were investigated by interviews and the results showed that understudies were exceptionally content with the Scrum project that was scattered and they experienced a more massive degree of versatility during the endeavor, the level of venture, correspondence, and worked with exertion can in like way be adequate formed on the web [11].

METHODOLOGY

The product advancement technique applied in this investigation utilizes the Scrum system. This investigation starts with readiness and amplifies the comprehension of specialists in regards to scrum, so the information on the scrum structure and its execution in the administration of programming improvement undertakings can be applied in this product advancement [12]. The essential principle in executing the Scrum structure is the affirmation that customers will change their points of view on what they need or need (habitually called insecurity essentials) and there will be impulsive hardships in which the farsighted or organized technique isn't longer suitable, for the present circumstance collaboration customers in completing scrum are moreover vital, especially the best chance for coordination, advice, and correspondence with respect to their necessities. Three guideline parts in the Scrum structure cooperate to make the thing redesigns that set off by each run, these Product Owner (PO), Development Team (DT), and Scrum Master (SM) are the positions that make up the Scrum Team. [13]. The Scrum structure plot applied in this assessment can be found in the going with the figure [14]:
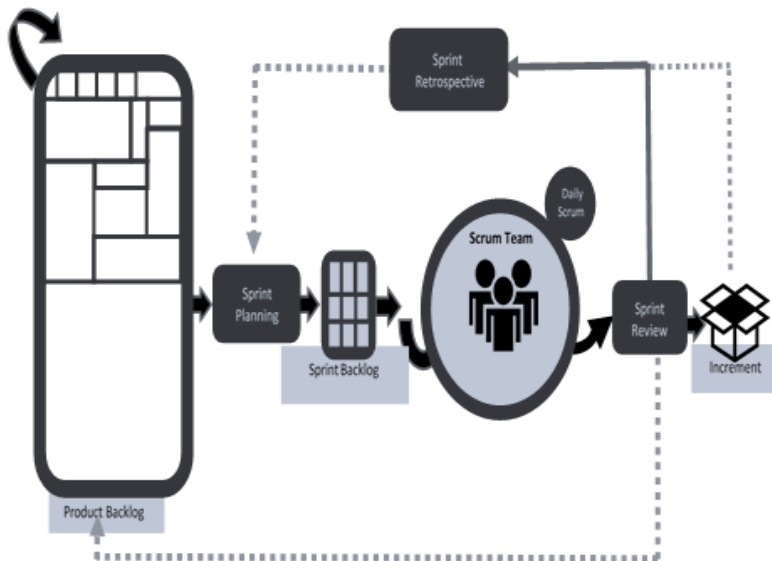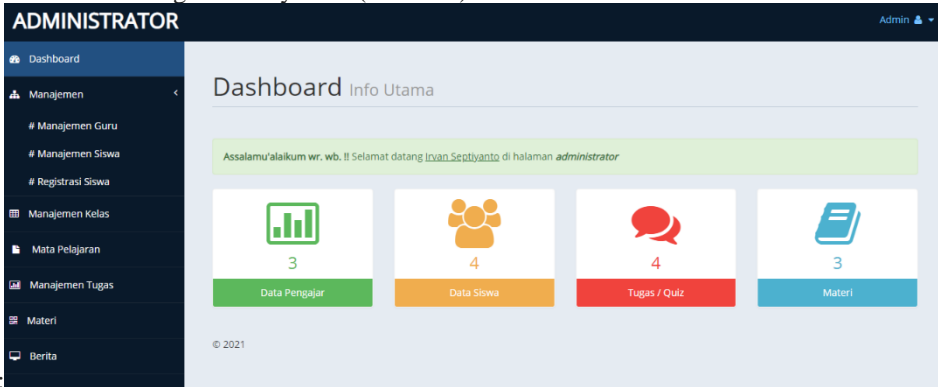
Figure 2 Scrum Framework

RESULTS

a.Mobile Application Design

The arrangement of the improvement of anlearning flexible application is made using the Unified Modeling Language which is a lot of gadgets used to remove in developing a structure [15]. UML is used to separate systems or thing-based programming [16]. UML is used to choose, imagine manufacture, and file in developing a structure with a specific programming language code [17]. UML graphs in this examination are depicted as Use Case Diagrams that are the structure's supplied components as units for exchanging messages between units or performers, and A class diagram is a type of static development layout that depicts a system's plan by displaying system classes, credits, and exercises (techniques), and associations between for objects [18].

Figure 3 Use Case Diagram

Figure 4 Class Diagram

b.User Interface

In this research, two User Interfaces were created. , they are the front end (for customers) and the back end (for leaders). Both are made with a versatile stage using an android studio which is a planned improvement environment - for android applications headway, considering Intellij IDEA [19]with an open-source MySQL informational index;

Relational Database Management System (RDBMS). The UI that has been created can be found in Figure 4 underneath:

Figure 5Web Application Interface

DISCUSSION

The development of a learning mobile application is conducted using the Scrum framework, with the following for explanation:

a. Product Backlog.

The item excess intends to decide they need work that should be finished during the run, for this situation an arranging meeting is directed including the Product proprietor, Scrum Master, and Development Team. In the arranging meeting, they disk about media that work with the local area in giving assets, handling of assets contributing information, raising money budget summaries, focusing on to subsidizing for helpful social requirements. They examine issues as well as about the arrangements that are versatile application advancement. The instruments expected to take care of the issue are additionally resolved in this arranging meeting. The board of item overabundance is totally to be the obligation of the item proprietor, so the item proprietor in a roundabout way decides the undertaking vision/reason. By utilizing the Scrum Framework, a fruition of the e-learning application. finishing of the eLearning application can be finished in only 36 days, following subtleties in table 1.
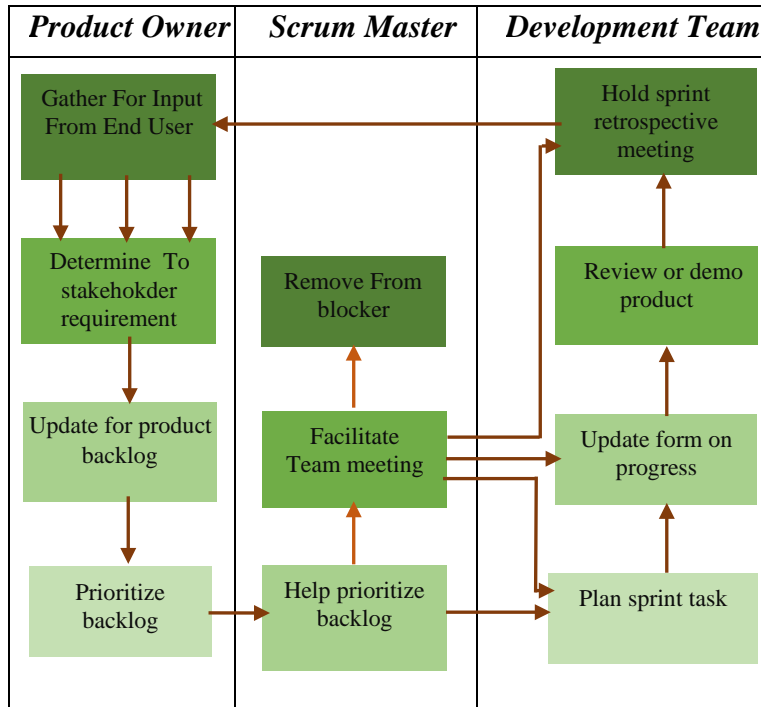
Table 1 : Product Backlog

D	Product Backlog Item	Priorization	Estimate In Day
	Identification and Analysis System		
	Define detail of Solution System		
	Identification of Needs		
	System Design and Prototyping (UML Design, UI / UX Design)		
	Testing Application Software Testing using Black Box)		
	Usability Testing Application		

	Database Design and Creation with My SQL	
	Systemwide integration Joining of versatile application frameworks utilizing information bases, and reconciliation between overseer menus)	
	Coding in making applications	4
0	Application for improvements and refinements Going through in the interaction of incorporation and testing, then, at that point the web application is fixed and refined to stay away from bugs/blunders	
1	Release After the application has been coordination, tried, then, at that point fixed/refined dependent on the necessities of the item proprietor and the item has been reported in as per the underlying arrangement, then, at that point the versatile application can be released)	
	Days Total	6

b.Sprint Planning

The Sprint Planning stage is the stage to detail the errands to be done in a portable application advancement project which will be led by all groups, they are item proprietor, scrum expert, and improvement group. The improvement groups identify with framework investigation, User Interface/User Expreiencedesign, coding or programming (front end and back end), and programming testing. This stage is resolved that the improvement group comprised of 3 individuals without explicit. This stage is directed each time will do a run.

Table 2: The Sprint Planning Meeting

c.Sprint Backlog

Improvement group makes an image of the genuine task that is being chipped away at, as per the arrangement of the item proprietor at the item overabundance for stage. This stage is led each time will do a run. d. Every day Scrum Day by day Scrum and a phase when all individuals from the improvement group share the issues experienced and give answers for one another's issues, my Team likewise share the outcomes/progress of their work, including framework examination, User interface or User Expreience configuration, coding or programming, and then programming testing. Day-by-day scrum completed each day during the run until finished.

Table3 Sprint 1

Item Task	Responsibility	Status	Day Count in Sprint					
			1	2	3	4	5	6
Initial system identification								
Indetification Process and Requirement	Business Analyst	Completed	1	1	1	0	0	0
DesignConcept sistem								
Usecase Diagam	Business Analyst	Completed	0	0	0	0.5	0	0
Activity Diagram	Business Analyst	Completed	0	0	0	0.5	0	0
Sequence Diagram	Business Analyst	Completed	0	0	0	0	0.5	0
Class Diagram	Business Analyst	Completed	0	0	0	0	0.5	0
UX Design	Business Analyst	Completed	0	0	0	0	0	0.5
UI Design	UI Designer	Completed	0	0	0	0	0	0.5
Design Database								

Create Database and table	DBA	Completed	0	1	1	1	1	1

Table5 Sprint 2

Item Task	Responbility	Status	Days
Design Interface	Developer	Completed	1
Coding MVC	Developer	Completed	1
Development Interface	Developer	Completed	1
Coding MVC	Developer	Completed	1
Development Interface	Developer	Completed	1
Coding MVC	Developer	Completed	1

Table5 Sprint 3

Item Task	Responbility	Status	Days
Development Interface	Developer	Completed	0.5
Coding MVC	Developer	Completed	0.5
Design Interface	Developer	Completed	0.5
Coding MVC	Developer	Completed	0.5
Design Interface	Developer	Completed	0.5
Coding MVC	Developer	Completed	0.5
Design Interface	Developer	Completed	0.5
Coding MVC	Developer	Completed	0.5
Design Interface	Developer	Completed	0.5
Coding MVC	Developer	Completed	0.5
Design Interface	Developer	Completed	0.5
Coding MVC	Developer	Completed	0.5
Design Interface	Developer	Completed	0.5
Coding MVC	Developer	Completed	0.5
Design Interface	Developer	Completed	0.5
Coding MVC	Developer	Completed	0.5

Table6Future Sprint

Item Task	Responbility	Status	Days
System-wide integration	System Analyst	Completed	4
Testing	Tester	Completed	2
Improvement	All	Completed	3

Release	Developer	Completed	2

At this stage, the application is tried. The creator utilizes a testing strategy with a Blackbox Testing approach. The Blackbox Testing strategy performs testing without taking a gander at the source code of the program and is controlled by the analyzer or client to see whether the application has gotten input, handled, and delivered yield, the test outcomes can be found in the table underneath.

Table 7Blackbox Testing

FeaturedTesting		
Featured Tested	**Featured Expected**	**Status**
PageHome	Display menu PageHome	[✓] Done [　] No
Page Login	Display Menu Page Login, contentemailandpassword	[✓] Done [　] No
Web Service Page Login	Received email andpassword	[✓] Oke [　] No
Page Dashboard	Display menu Page dashboard	[✓] Done [　] No
Menu PagemanagementInstructor	Display nip, name, sexand status	[✓] Done [　] No
Web Service Page management Instructor	Provide nip, full name, sex,and status	[✓] Oke [　] No
Menu Page management members	Display nis, full name, sex, address, Class,and status	[✓] Done [　] No
Web ServicePage management Member	View nis, name, sex, address, class,and status	[✓] Oke [　] No

Menu Page Registrasi Member	Displayid,full, sex, birthday, address, and status	[✓] Done [ ] No
Web ServicePage Registrasi Member	Display nis, full, sex, birthday, address, and status	[✓] Oke [ ] No
Menu Page management Class	Displayclass name andinstructor	[✓] Done [ ] No
Web Service Page management Class	Display class name and instructor	[✓] Oke [ ] No
Menu Page Course	Display list course	[✓] Done [ ] No
Web Service Page Course	provide course id, and course	[✓] Oke [ ] No
Menu Page management Tugas	Display Subject, Class, Course, Creation date , time, info and status	[✓] Done [ ] No
Web Service Page Task management	Display Subject, Class, Course, Creation date , time, info and status	[✓] Oke [ ] No
Menu Page Content	Display Subject, Class, Course, Creation date , time, info and status	[✓] Done [ ] No
Web Service Page Content	provide judul, class, category, name file, posting date, Creation date, and viewer	[✓] Oke [ ] No

Menu Page News	Display subject, content, posting date, authors and status	[✓] Done [ ] No
Web Service Page News	Provide subject, content, posting date, authors and status	[✓] Oke [ ] No

e. Sprint Review

      Run survey a phase when each colleague exhibits the consequences of his/her work in a run. This stage is done after one run is finished. For this situation, all colleagues exhibited a raising money portable application advancement project and assess each other then at long last all colleagues' works are joined together and coordinated.

f. Run Retrospective

      The Sprint Retrospective is directed toward for finish of each run. this stage, the improvement group presents in to the item proprietor and scrum ace about the scrum interaction that is being carried out in fostering a raising money versatile application. The advancement group additionally presents the testing aftereffects of raising money versatile applications utilizing convenience testing as an item assessment procedure with checking to clients [20]. Five components are the fundamental components of ease of using testing. They are Usability, Efficiency, Effectiveness, Satisfaction, and Accessibility[21].

      The addition is the last advance of the Scrum Framework. This stage is a consequence of finished work to help observation and it is can be investigated toward the finish of the Sprint. For this situation each the run result, augmentation is a stage to accomplish the objective/vision. At this stage the item proprietor likewise chooses whether the undertaking has been finished or not.

CONCLUSION

Given the aftereffects of the finished examination, it very well may be inferred that the way toward creating raising support portable applications utilizing the Scrum system can be quicker cultivated, it just requires is 36(days) to finish all work. Because scrum groups are involvement, with interaction of fulfillment, then, at that point information can be all around incorporated, the issues during application advancement are all the more immediately addressed. The result of versatile application makes raising money data to scatter simpler, occupants get ongoing notice framework, and the application likewise makes individuals effectively to give.

Table 7: Benefit Execution of Scrum Framework

Case	Description
Estimated for Task Details	By utilizing the SCRUM structure, toward the finish of the run for like clockwork the subtleties of the obligations of each colleague are pointed by point.
Quality	With a sprint, each colleague gets greater support in finishing each job. In this way, it's anything but a quality program.
Quality Control	At each finish of the run, a Sprint Review is finished with the objective that the idea of the program can be supported.

Risk	Each Error that shows up during the improvement cycle is recorded in the Monitoring Board in the engineer group's space for additional re-assessment purposes.
Application View	Toward the finish of each sprint, each colleague reexamines what changes have been made.
Business Change	Business measure changes will be examined later in the last run after the application demo.
Customer Feedback	Every client input will be talked about in the last run measure after the client sees the consequences of the application demo.
Project Monitoring	By utilizing the SCRUM framework that gives checking sheets, it can make it simpler for the advancement group to make project observing simpler
Live (Production)	With the utilization of the SCRUM Framework it is feasible to do improvement straightforwardly, and can be finished per item as per the item build-up that has been made.

In view of the investigation and advancement of the elearning framework that has been done and the consequences of the conversation in the past segment, the accompanying ends are gotten:
•Risk and quality debasement can be recognized all the more rapidly during the improvement cycle.
•In the last run, changes to the business cycle and criticism from clients can be effortlessly distinguished.
•Completion of the program should be possible per item excess.
•Program culmination speed can be seen straightforwardly during the improvement cycle.

In the impending turn of events, the utilization of new strategies will be utilized in business changes and limitations on input from clients will be completed so the activity will meddle with the time focus of the undertaking.

This paper writes about a Scrum-based way to deal with instruct customary undertaking the board content in an undergrad IT project the executives course. Through rehashed practice, understudies created sensations of ability in socially-unpredictable delicate abilities, which are quite possibly the most troublesome ideas of nimble motivated undertaking the board draws near, yet can outsizedly affect project achievement.

REFERENCES
[1]   Supangat, A. Amna Rahmawati, T. Rahmawati, and G. Kusnanto, E-Learning Development As Interactive System With Scrum Methodology, pp. 1–5, 2019.
[2]   W. F. Hidayat, A. Purnamewati, and F. Sarasati, IMPLEMENTATION OF THE SCRUM MODEL IN THE DEVELOPMENT OF ONLINE SALES SYSTEMS OF MSMEs DURING THE COVID-19 PANDEMIC,J. Techno Nusa Mandiri, vol. 18, no. 1, pp. 55–64, 2021, doi: 10.33480/techno.v18i1.1896.
[3]   K. Bhavsar, Shah, and S. Gopalan, Scrumbanfall: An Agile Integration of Scrum & Kanban with Waterfall in Software Engineering, Int. J. Innov. Technol. Explor. Eng., vol. 9, no. 4, pp. 2075–2084, 2020, doi: 10.35940/ijitee.d1437.029420.
[4]   F. Ridha and E. Hegarini, "Analysis of Maturity Level Project Management of Software Development In Scrum Framework: Case Research On Tribe Enterprise PT. XYZ," IT J. Res. Dev., vol. 5, no. 1, pp. 87–97, 2020, doi: 10.25299/itjrd.2020.vol5(1).4662.
[5]   B. G. Sudarsono, Fransiscus, H. Hartono, D. Y. Bernanda, and J. F. Andry, "Adopting scrum framework in a software development of payroll information system," Int. J. Adv. Trends Comput. Sci. Eng., vol 9, no. 3, pp2604–

2611, 2020, doi: 10.30534/ijatcse/2020/17932020.

[6]   M. Thesis and S. Bhaker, "Scrum — Agile Project Management," no. March, 2009.

[7]   N. Ruseno, "Implementasi Scrum pada Pengembangan Aplikasi Sistem Reservasi Online Menggunakan PHP," Gerbang, vol. 9, no. 1, pp. 8–15, 2019.

[8]   A. B. Farid, "Implementing Project Management Category Process Areas of CMMI Version 1 . 3 Using Scrum Practices , and Assets," vol. 7, no. 2, pp. 243–252, 2016.

[9]   M. Paasivaara, S. Durasiewicz, and C. Lassenius, Distributed Agile Development : Using Scrum in a Large Project Distributed Agile Development : Using Scrum in a Large the Project," no. March 2014, 2008, doi: 10.1109/ICGSE.2008.38.

[10]   S. Ali, "A Hybrid Agile model using SCRUM and Feature Driven Development," no. December, 2016, doi: 10.5120/ijca2016912443.

[11]   J. Söderback, S. Hrastinski, and L. Öberg, Using Distributed Scrum for Supporting Online Collaborative Learning - A Qualitative Descriptive Study of Students Perceptions Theoretical background , 2012.

[12]   P. Adi and G. Permana, Scrum Method Implementation in a Software Development Project Management vol. 6, no. 9, pp. 198–204, 2015.

[13]   K. Schwaber, "The Scrum Guide ^{TM}," no. November, 2017.

[14]   Morris, Scrum An Ideal Framework from Agile Project In Easy Step. 2017.

[15]   W. Boggs and M. Boggs, Mastering UML with Rational Business Modeling. 2002.

[16]   "UML Distilled (Third Edition)," pp. 1–118.

[17]   N. Ruseno et al., "Rancang Bangun Aplikasi Pemesanan Tiket Umrah Menggunakan Algoritma First In First Out (FIFO) Berbasis Website," 2020.

[18]   B. G. Sparks, "Database Modelling in UML."

[19]   N. Ruseno, "Menggunakan Framework Mvc (Model View Controller)," J. Kaji. Ilmu dan Teknol., vol. 7, no. 1, pp. 1–90, 2018.

[20]   R. Martin, M. Al Shamari, M. E. Seliaman, and P. Mayhew, Remote Asynchronous Testing : A Cost-Effective Alternative for Website Usability Evaluation, no. February, 2014.

[21]   S. Service, C. Duta, N. A. Santoso, G. Virginia, and B. Susanto, "Evaluation Interface Design to Build User Experience on," vol. 15, no. 1, pp. 26–35, 2017.