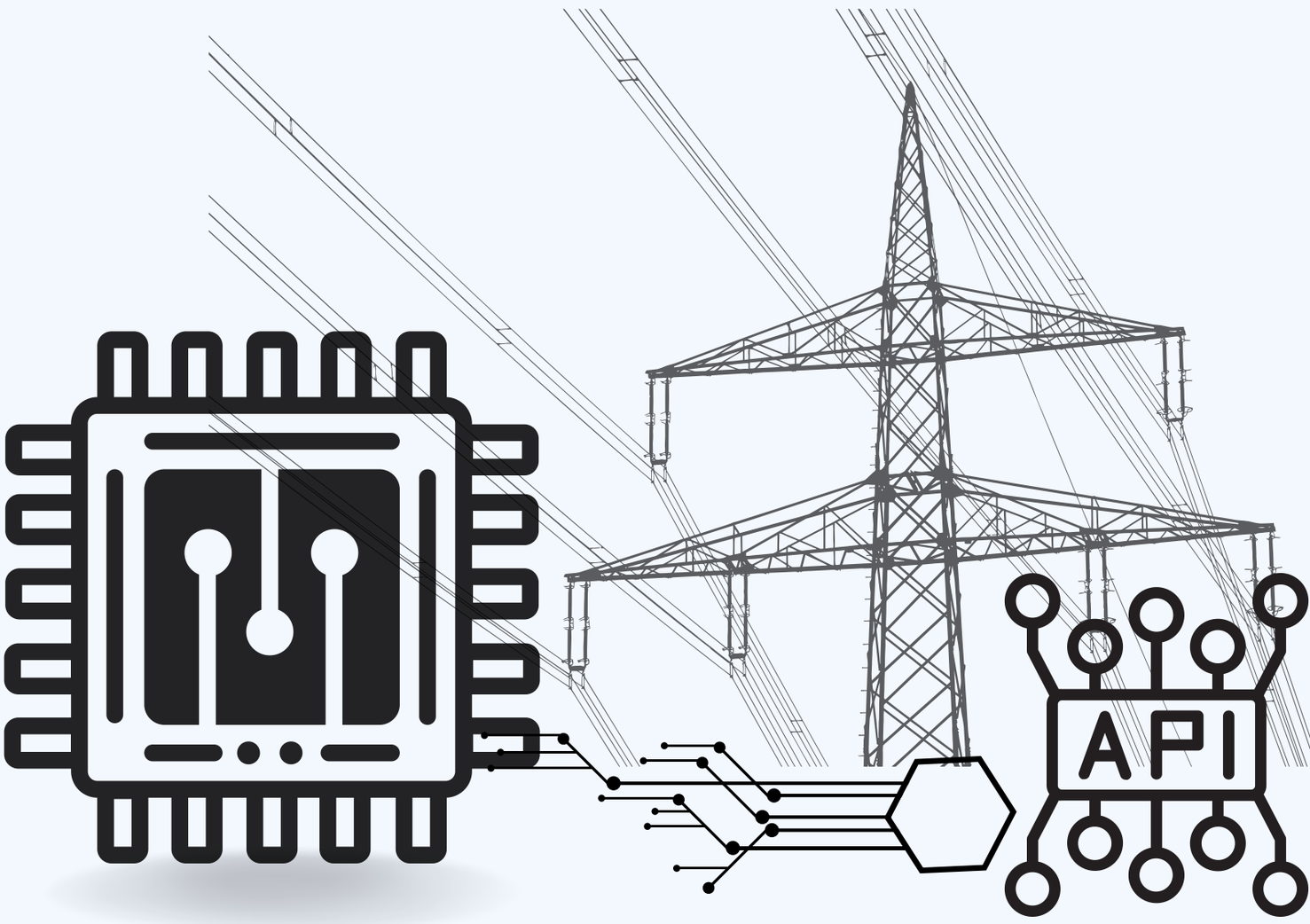
ICITACEE 2023

THE 10TH INTERNATIONAL CONFERENCE ON INFORMATION TECHNOLOGY, COMPUTER, AND ELECTRICAL ENGINEERING

PROCEEDINGS



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GREETINGS FROM THE GENERAL CHAIR

Welcome to the 10th International Conference on Information Technology, Computer, and Electrical Engineering (ICITACEE). ICITACEE is a yearly event hosted by the Faculty of Engineering, Universitas Diponegoro, and operated by the Department of Computer Engineering and Department of Electrical Engineering. This year, ICITACEE is organized by Department of Computer Engineering and offers a cross-diciplinary forum for researhers in the field of Information and Computer Technology, Power system, Circuit and Control, Communication Sytems, and Green Technologies. Through this forum, it is expected that all participants can interact and disseminate the latest issues and findings based on their recent research.

The ICITACEE 2023 is held in Grand Candi Hotel, Semarang, on August 31st – September 1st, 2023. We received more than 140 papers to be reviewed, and the acceptance rate is 65% which means that only 89 papers are accepted. Geographically, researchers from 12 countries are involved in this event, and papers that have been presented, will be submitted to IEEE Xplore to be published. In this event, we also invited keynote speakers including Professor Suhaidi Hassan from Universiti Utara Malaysia, Assoc. Professor Haiyan Lu from University of Technology Sydney Australia, Jusuf Sjariffuding the founder and CEO of Indivara Group, and Assoc. Professor Aghus Sofwan from Universitas Diponegoro. We believe that the idea shared with us in this event can provide an insight regarding the future direction of research in the artificial intelligence field.

Finally, we would like to thank to our standing committee who made this event possible. We also like to say our gratitude to all staffs of Department of Computer Engineering and Department of Electrical Engineering Universitas Diponegoro for their continuous supports on this event. Moreover, our special thanks goes to the IEEE Indonesia Section, reviewers, authors, chair members, committee members, and other volunteers and participants who provide kind assistance on all aspects of the conference. I hope everyone can enjoy this event, and it would be a pleasure to see you again on the 2024 ICITACEE.

Rinta Kridalukmana, S.Kom., M.T., Ph.D
General Chair
2023 10th International Conference of Information Technology, Computer, and Electrical Engineering (ICITACEE)

FOREWORD FROM HEAD OF DEPARTMENT OF COMPUTER ENGINEERING, UNIVERSITAS DIPONEGORO, SEMARANG – INDONESIA

Welcome to all the participants in The 10th International Conference on Information Technology, Computer, and Electrical Engineering (ICITACEE 2023) at Grand Candi Hotel, Semarang, Indonesia.

I would like to welcome keynote speakers from the University Utara Malaysia, the University of Technology Sydney, Founder, President, and CEO of Indivara Group, and Diponegoro University.

This is the tenth conference by the Computer Engineering Department and Electrical Engineering Department of Engineering Faculty, Universitas Diponegoro. I appreciate the vast work at this conference as a collaborative effort among the Computer Engineering Department, Electrical Engineering Department, Universitas Diponegoro, and IEEE Indonesia Section. This conference will be a prestigious forum to communicate and share the findings and precious research among computer, information technology, and electrical engineering experts. I want to express my deep appreciation to the Organizing Committee members, staff, and students of the Computer Engineering and Electrical Engineering Department of Universitas Diponegoro for their effort and support. This event will give a contribution to the global development of Computer Engineering as well as Electrical Engineering.

Dr. Adian Fatchur Rochim, S.T., M.T., SMIEEE.
Head of Department of Computer Engineering
Faculty of Engineering – Diponegoro University
Semarang – Indonesia

FOREWORD FROM DEAN OF FACULTY OF ENGINEERING UNIVERSITAS DIPONEGORO, SEMARANG – INDONESIA

The 2023 10th International Conference on Information Technology, Computer, and Electrical Engineering (ICITACEE 2023) is now held again as an annual conference organized by Department of Computer Diponegoro University.

The conference aims to provide a forum for researchers, academicians, professionals, and students from various engineering fields with cross-disciplinary working or interest in developing and designing information technology, computers, and electrical engineering to interact and disseminate the latest issues and researchers.

ICITACEE 2023 also invites scholars and encourages researchers to submit high-quality manuscripts and papers to this conference. It is also to share and exchange ideas, thoughts, and discussions on all aspects of the development and design of information technology, computers, and electrical engineering to facilitate the formation of networks among participants of the conference for improving the quality and benefits of the research.

It is a great pleasure to welcome all the participants of this conference in Semarang. I also welcome the keynote speakers from the University Utara Malaysia, the University of Technology Sydney, the Founder, President, and CEO of Indivara Group, and Diponegoro University. This conference will be a valuable forum for engineers and scientists to share their precious research, and this event will give significant contributions to the development of Information Technology, Computer, and Electrical Engineering. It will raise the awareness of scientific community members in bringing better life.

I hope that the conference will be stimulating and memorable for you. So, enjoy your time in Semarang.

Prof. Ir. M. Agung Wibowo, MM, MSc, PhD
Dean of Faculty of Engineering
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ICITACEE 2023

KEYNOTE SPEAKER

KEYNOTE SPEAKER 1	
	**PROF. DR. SUHAIDI HASSAN, Ph.D., PTech FAPM, SMIEEE** Universiti Utara Malaysia **Keynote Title**: Embracing Digital Transformation Towards the Internet of the Future: Emerging Technologies, Potentials and Challenges
Prof. Dr. Suhaidi Hassan is a tenure track professor in computer and communication networks at Universiti Utara Malaysia (UUM. He holds a bachelor's degree in computer science from the State University of New York in Binghamton, a master's degree in information science from the University of Pittsburgh, and a Ph.D. in computing from the University of Leeds. He is the founding chairman of the UUM InterNetWorks Research Laboratory. Prof. Hassan is a fellow of the Academy of Professors Malaysia and has served as the founding President of the Internet Society Malaysia. With over 300 scholarlyindexed refereed technical publications to his name and 27 successful Ph.D. supervisions in his field of expertise, Prof. Hassan is an accomplished researcher and mentor. He has also served on numerous national and international committees and councils, including the Malaysian Research and Educational Network (MYREN) and the Malaysian ICT Deans Council. In 2006, he led an initiative to establish an International Telecommunication Union (ITU)-UUM AsiaPacific Centre of Excellence for Rural ICT Development. Prof. Hassan is also an active participant in international forums such as ICANN meetings, Internet Governance Forums, and IETF meetings.	

KEYNOTE SPEAKER 2

Assoc. Professor Haiyan Lu
University of Technology Sydney, Australia

Keynote Title:
Skeleton-based Human Action Recognition: From 3D Pose Estimation to Action Recognition

Dr Haiyan (Helen) Lu is an associate professor, the Head of Discipline of Data Analytics and AI (Artificial Intelligence), in the School of Computer Science, Faculty of Engineering and Information Technology, University of Technology Sydney (UTS), Australia. She is a core member of the Decision Systems and e-Service Intelligence Research Laboratory in the Australian Artificial Intelligence Institute at the University of Technology Sydney (UTS).

She received her Bachelor and master's degrees in Harbin Institute of Technology (HIT) China in 1985 and 1988, respectively, and PhD degree from the University of Technology Sydney in 2002. She is a senior member of IEEE.

Her main research interests are heuristic optimization techniques, machine learning, forecasting and prediction of time series, ontology-based knowledge representation, recommendation systems.

She has contributed to total 195 publications, including 3 book chapters, 102 refereed journal articles and 90 refereed international conference papers in the following four research areas:

- Statistical learning algorithms, computational intelligence (especially heuristic global search algorithms) and machine learning techniques for time series forecasting and scheduling problems in smart grid applications.
- Ontology based knowledge representation and modelling for intelligent Information Systems for smart e-service systems.
- Design and simulation of electromagnetic devices with a focus on modelling of magnetic materials
- Edge computing for smart IoT systems in smart grid applications

KEYNOTE SPEAKER 3

Jusuf Sjariffudin
Founder, President, and CEO of Indivara Group

Keynote Title:
Helping BPRs and UMKM goes digital

Jusuf Sjariffudin is the Founder, President, and CEO of PT Indivara Sejahtera Sukses Makmur (Indivara Group), responsible for determining the firm's overall strategic direction as well as the management of the company to ensure long-term and sustainable profitability.

Prior to founding Indivara, Jusuf founded Jatis in 1997. Under his leadership Jatis enjoys significant growth and becomes a dominant technology solution provider in Indonesia and is increasingly replicating that success across the region. In 2015 Jusuf founded Indivara and consolidated Jatis and all other technology companies, which he also founded, into one group. Indivara has two main divisions - Business Enabler and Platform and is one of the largest largest technology group in ASEAN with significant presence in Indonesia, Singapore, Malaysia and the Philippines.

Before being a technology entrepreneur Jusuf was with Lotus Consulting (Asia Pacific) as Chief Technology Officer and the main architect behind the firm's Lotus Consulting Intranet framework codename Velo, which was instrumental in the achievement of its revenue target for Lotus Consulting in the Asia Pacific Region. On the business end, he was also involved in establishing Lotus Consulting Indonesia and Korea practice.

Jusuf spent his early career with Andersen Consulting as a Senior Consultant of the Technology Integration Services Group. In his position, Jusuf was responsible for providing technical consultancy services within the Financial Service and Government sectors. Jusuf Sjariffudin holds a bachelor's degree in computer engineering from the Nanyang Technological University, Singapore.

Achievements:
- Partner Award (Andersen Consulting, 1995)
- Asia Pasific Director's Excellent Award (Lotus Consulting, 1996)
- Enterpreneur of the Year Award for Indonesia (Ernst & Young Enterpreneur of the Year Program, 2001)

KEYNOTE SPEAKER 4

Assoc. Professor Aghus Sofwan
Department of Electrical Engineering, Universitas Diponegoro

Keynote Title:
AI's role in people's daily activities

Aghus Sofwan, S.T., M.T., Ph.D. is an associate professor and The Head Department of Electrical Engineering, Engineering Faculty, Diponegoro University, Semarang, Indonesia. He is an IEEE member and has competent in Information Technology.

He received his Bachelor's Degree in Electrical Engineering from Diponegoro University in 1995, a Master's in Computer Science from Gadjah Mada University in 2002, and an Electrical Engineering Ph.D. from King Saud University in 2016.

His main researches are Internet of Things, Artificial Intelligent, and mobile computing. He has 151 articles published in Scopus, WoS, and Google Scholar and has 3 IPRs. His recent research discusses autonomous object recognition robots for logistic transport.

Parallel Session I Schedule

(Online/Zoom)

Parallel Class	Online
Room	Breakout Room D
Time	13.15 – 15.15
Chair	Arseto Setyo Nugroho

No	Paper ID	Title	Time	Presenter
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Digital Counseling Model with Deep Learning for Mental Health of Vocational School Students

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Abstract— Indonesia is preparing to become a developed country in 2045, so it is essential to prepare infrastructure, policies, and human resources. Today's youth will be the spearhead for the next 20 years, so they must be well prepared. Not only smart, intelligent, and spiritually intelligent, but also has a good mentality. Maintaining mental health is very important to produce human resources who are physically and spiritually healthy. Surveys show that 10-20% of Indonesian youth have mental disorders. The causes of this problem can be internal and external, including the Covid pandemic. This research aims to develop a model that can help school counselors detect students' mental health quickly, precisely, and flexibly. The method used is observation, data collection by questionnaire, data analysis, model development, evaluation, testing, and dissemination of research results. This study resulted in a model developed with deep learning artificial intelligence (AI), which can provide information and detect mental health in students. After going through the stages and testing, a testing accuracy of 96% was obtained, which means the model can carry out digital-based counseling to students. The results can be trusted as a basis for psychologists to provide therapy if students experience depression. This model will significantly assist in the guidance process, which can be carried out flexibly at or outside school.

Keywords— depression, digital, counseling, models, AI

I. INTRODUCTION

Indonesia will be a developed country in 2045, so it is essential to prepare infrastructure, policies, and human resources. Today's youth will be the spearhead for the next 20 years, so they must be well prepared. Not only intelligent, intelligent, spiritually intelligent, but also has a good mentality. Maintaining mental health is very important to produce human resources who are physically and spiritually healthy. Surveys show that 10-20% of Indonesian teenagers experience mental problems. The causes of this problem can be internal and external, including the Covid pandemic. This research aims to develop a model that can help school counselors detect students' mental health quickly, precisely, and flexibly. The methods used are observation, data collection with questionnaires, data analysis, model development, evaluation, trials, and research results dissemination. The results of this study resulted in a model developed with artificial intelligence. Indonesia, with a population of 300 million people, has a very high chance of moving from a developing country to a developed country in 2045. The transition to becoming a developed country can be hindered due to the people's increasingly apprehensive mental health conditions, affecting national productivity. The youth generation is the nation's next generation who will become superior to human resources 20 years later. This generation must be prepared to be intelligent at heart, spiritually intelligent, and have a good mentality.

A survey conducted [1] in 2022 on adolescents aged 10-17 years showed that 15.5 million (34.9%) Indonesian adolescents experienced mental problems, and 2.45 million (5.5%) adolescents experienced mental disorders. With the presence of COVID-19, adolescent mental health problems have increased again. Research in 2021 shows that 20% of the 250 million Indonesian people have the potential to experience mental health problems [2]. It means 1 out of 5 residents has the potential for mental disorders.

The mental health of children and adolescents is essential to maintain and pay attention to. This problem has become a hot topic of discussion because of the COVID-19 problem, which causes many students to experience mental problems such as anxiety, stress, and depression. This condition includes many adults who have experienced stress during the pandemic and post-pandemic. This mental health problem will affect academic achievement, resilience in dealing with problems or resilience, career, discipline, emotions, and quality of life [3].

Personal and family problems of students significantly affect their mental health. Parents who are very aware of their child's mental development try to care for and maintain their mentality since they are in the womb, born and grown. Parents are increasingly aware of their child's mental health by consulting a doctor or psychiatrist to check their child's mental

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condition and hobbies and directing children according to their talents.

At school, the teacher/counselor, besides teaching, is also tasked with directing children's talents and interests through guidance at school. Assist children in solving problems faced at school and assist. However, through the author's observations, it is infrequent for children to use counseling services, so counselors at school do not know student progress. Every child's character and development cannot be considered the same.

Many children choose expertise programs not because they are happy but instead follow the advice of friends or parents [4]. With these conditions, children need more enthusiasm and attention to solve academic problems and achieve academic achievement. They need counseling to deal with the environment at school and home so that they can graduate on time, follow learning well, and excel.

With limited counseling services, it can be suggested to take part in online counseling services known as digital counseling. The dense class hours, curriculum changes, apprenticeship programs, entrepreneurship programs, assignments, and exams require good and prime mental health. Do not let students experience anxiety, stress, and depression. So it is necessary to conduct counseling whenever and wherever, even outside of school hours, to avoid disturbing their time and activities. Counseling can also be done flexibly from anywhere.

Unlike general high schools, vocational schools were chosen because they have expertise programs. Children who choose vocational schools are expected to get jobs according to their expertise. So school activities are busy, accompanied by a practicum in laboratories and workshops.

Students in vocational schools tend to face more pressure than regular schools. In addition to the pressure of mastering skills and expertise at the internship location, there are also several pressures due to work, economic problems, family, and academic demands. So that with these problems, a digital counseling model was developed that can be used to address mental health problems that they may experience from an early age.

II. LITERATUR REVIEW

A. Student Mental Health

Mental health is significant to pay attention to and keep sane. Good mental health is a condition of feeling calm and peaceful so that it is possible to enjoy life with gratitude and respect for the surrounding environment—that, of course, is very much needed by anyone, including students at school.

Mental health promotes physical, mental, and social well-being [5]. With a healthy mentality, students can explore their potential to the fullest and maximize their ability to face life's challenges. The most important thing is to complete all academic assignments correctly, master competence well, and avoid bad associations and environments. Able to control emotions well when dealing with friends, teachers, and the school environment.

If someone's metal has a problem, no matter how smart the teacher who teaches, it will not be accepted by students. They can commit violations, have harmful interactions, commit actions that harm themselves and the environment, and become public enemies.

What was surprising during the pandemic was that research [5] involved 235 respondents, the majority of whom experienced mild anxiety, as many as 99 students (42.13%) and moderate anxiety, as many as 38 students (16.17%). The research results related to stress levels showed that there were some students who experienced mild stress, namely 60 students (25.53%), related to depression levels, and 14 students (6.38%) experienced mild depression due to online learning during a pandemic.

How, then, do we talk about attitudes, character, achievements, or other things that should be obtained at school for high school students who usually experience hormonal fluctuations, change in attitude, and require special attention? Research states that the number of students who experience stress is increasing, which often has adverse effects, such as bad grades during academic probation and emotional problems [3].

Especially vocational students sometimes experience anxiety about the future. This condition is also experienced by students abroad who are psychologically depressed and anxious, which affects daily life and can hinder academic activities [6]. Students need guidance and counseling services, especially during a pandemic with e-counseling technology. This service is needed to solve various kinds of mental problems in students at school [6].

This mental health problem is faced in various countries, not just Indonesia. Some cases experience severe depression that makes them isolate themselves from others, drop out of school, or, even worse, commit suicide. So that in Malaysia, remote mental health monitoring research has been developed to help facilitate early intervention and refer to counseling sessions to seek psychiatric help [7], [8].

Students in the first year experience various changes, so they can increase anxiety, stress, and depression by seeing a higher tone of voice, as in research conducted in Poland on dental medicine study programs [9]. The results of research on Chinese high school students are also at high risk of experiencing anxiety, while college students are at high risk of experiencing depression [10].

In addition to conditions at school that can cause mental problems, it turns out that adverse childhood experiences are also a significant determinant of depression in adolescence and adulthood, so services are needed that can help protect, prevent, and treat these mental problems [11].

Research in Selangor Malaysia found that in the scores for the five factors, 9.2% had a negative mood. 5% have interpersonal problems. 8.3% had ineffectiveness. 9.8% had anhedonia, and 10.6% had negative self-esteem. Female students are more stressed than male students [12].

Research in Ethiopia shows that students in rural areas experience problems, especially in women who chew gum, social phobia, depression, smoking, and being an alcoholic. Therefore, expanding mental health services to all secondary schools and strengthening counseling services is recommended [13]. Research in Bengkulu, Indonesia, obtained data that the majority of students who experience depression are women (56.3%), and the second (48.8%) are children who have 1-3 siblings [14].

B. Vocational School

A vocational school is an educational institution that offers vocational education or skills training programs to prepare students to work in specific fields, such as technology, construction, mechanics, beauty, tourism, etc. These programs usually provide practical training and focus on the technical and professional skills needed in the world of work. Vocational schools can be found in many countries and are often an alternative for students who want to enter the workforce more quickly or acquire the skills needed in specific fields.

So that the government launched various kinds of programs to support vocational education programs at both the high school and tertiary levels. In 2020, the Director General of Vocational Studies issued a fast-track program from Vocational Schools to Diploma 2 study programs [15]. Another program is the link and match of 400 study programs with industry, which at that time was only implemented by 133 study programs [16]. Another program being carried out is upgrading the Diploma 3 program to Diploma 4, which aims to provide opportunities for students to get a higher level of education to provide an excellent opportunity to fill essential positions needed by the industry with a new curriculum concept called Merdeka Learning and Merdeka Campus [17].

The demands for the vocational world are increasing daily, so it is necessary to improve teaching abilities, synergize, collaborate, revitalize, and teach factories with the industrial world to produce superior human resources[18].

With the motto of producing graduates ready to work, several changes have been made at Vocational Schools, including changing the vocational education curriculum. The developed curriculum must be relevant to the skills, challenges, and needs in the industrial world to produce a curriculum that has a broad impact on the government; educational institutions and industry must work together to revitalize the approach and content of the curriculum so that it can be optimal through the support of the government, industry, and the independent learning-campus policy independent [15], [19], [20].

C. Student Resilience

Student resilience refers to students' ability to rise from the difficulties and challenges they face and remain optimistic and enthusiastic in the future. Resilience is coping with pressure and stress and staying positive, focused, and productive. Students who have a high level of resilience tend to have the ability to solve problems better, have better endurance in facing challenges, and have the ability to maintain good mental and emotional health.

Resilience is the process of adapting a person well in the face of adversity, trauma, tragedy, threats, or significant sources of stress [21]. Some factors that can affect student resilience are social support from family and friends, ability to solve problems, ability to adapt to change, ability to gain a good understanding of oneself and others, and ability to regulate emotions.

Students' levels of resilience can be increased through programs designed to improve social and emotional skills, as well as through support from family, friends, and teachers. Student resilience is often directed toward academics, known as academic resilience. This resilience is the success of students in achieving good educational results despite experiencing difficulties [21]. He development of technology and the current globalization make students critical, intelligent, clever, have many desires, get bored quickly, and do not know real problems because they only see them virtually.

Here it is necessary to instill a strong mentality and foundation because intelligence is about more than just getting big marks, and instantly, sometimes the attitude of parents who are not aware of it always directs children to get big marks. The most important thing is how to accompany, guide, and process so that children feel comfortable learning, and good grades are a bonus.

Based on observing the current social phenomena with more virtual communication, it is crucial to instill resilience in adolescents so that they become individuals who can face life's challenges and avoid stress, depression, and hostile behavior that harms them and their social environment [22].

D. Counseling

Cases of students and adolescents related to deviant behavior, smoking, drinking alcohol, bad behavior, immorality, fighting against teachers, fighting against lecturers, and fighting against parents. This condition makes a reflection that their mental health is in trouble. Whether it is because of past trauma, personal problems, romantic relationships, hormonal changes, being harassed, bullied, not considered, belittled, said severely and all the treatment they receive will make them brutal, undirected, anarchic, depressed, panicky, commit suicide, kill others, become boomers, and other problems that are even more sinister.

Schools and campuses are required to provide counseling services. Student counseling is a process in which a counselor works with students to help them solve personal, social, academic, or emotional problems. Counselors usually use interviews, observation, tests, and group discussions to help students understand their problems and find ways to solve them.

In Turkey, counseling volunteers have been prepared to assist with in-person and online counseling services to help more people [23]. ome of the problems a person faces at school, work environment, or residence when conditions cannot adapt to situations causing discomfort, anxiety, and stress, which, if prolonged, will lead to depression. Research shows that the situation at school due to personal or family problems can trigger stress [24]–[26].

There are several ways to do counseling, such as face-to-face and online. Unique conventional processes for patients with severe conditions. You can use chat, chat, email, and questionnaires in the initial consultation. After the initial process, the initial mental health condition of the patient will be seen so that he can proceed to therapy [27]–[30].

III. DIGITAL COUNSELING MODELS FOR MENTAL HEALTH

Developing a mental health counseling digital model for students is a process with a complex sequence of activities. Developing this model involves several entities, such as counselors, teachers, researchers, students, schools, and validators. This process has long stages, and each stage will

be explained in more detail. As shown in Fig. 1, the steps involved in developing the model are as follows.

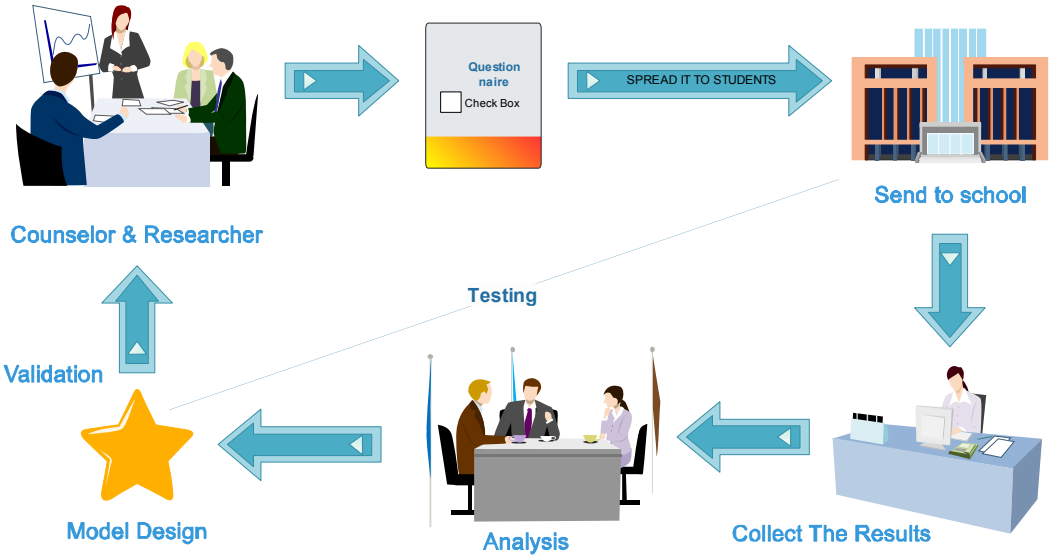

Fig. 1. Stages of Development of Digital Counseling Models for Students.

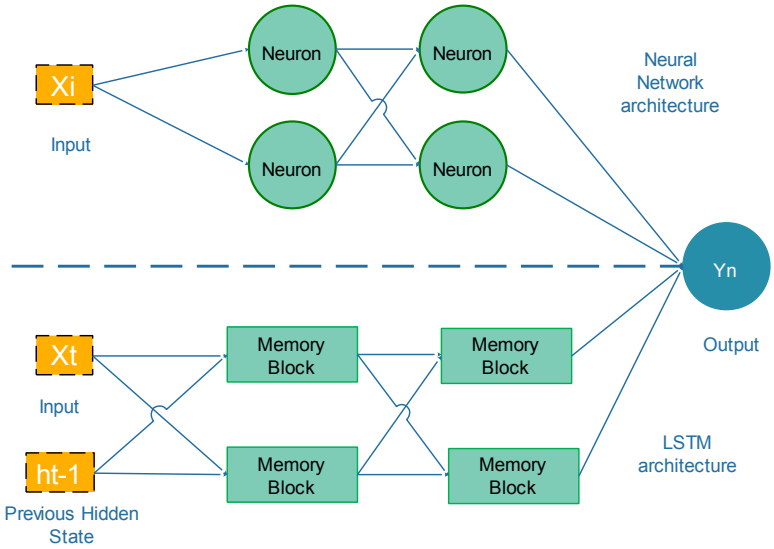

Fig. 2. Differences between NN and LSTM.

A. Data Collection

The data collection process was carried out at two SMKs, namely Bali Mandara Vocational High School, with an engineering background with three study programs, and Surya Medika Vocational School, which deals with health with two study programs. Further socialization will be carried out in July 2022; results will be recorded in September 2022. The questionnaire used is the DASS -21 (Depression et al.), with 21 items covering three physical, emotional/psychological, and behavioral variables. The results can show the levels, namely: normal, mild, moderate, severe, and extremely severe.

B. Data Analysis

After the data is collected, the next step is to analyze the data. This data will help in identifying trends and patterns. From October to November, an assessment and data analysis was carried out. The data collected was 145 with five classifications, namely Normal, Mild Depression, Moderate Depression, Severe Depression, and Very Severe Depression.

Based on the questionnaire used, there are several types of questions that lead to Depression, such as the following example :

- I cannot feel any positive feelings at all.

  Select Score : (never experienced 0 1 2 3 Often)

- I do not seem enthusiastic about doing an activity anymore.

  Select Score : (never experienced 0 1 2 3 Often)

The standard calculation formula in DASS-21 has attributes in the form of 21 questions that must be answered. Then it is calculated by adding up the scores on the questionnaire items, so three types of score classifications are obtained, namely Depression, Anxiety, and Stress. The following dataset used is the classification of Depression only.

Data was obtained by questionnaire in the form of numbers / numeric. Then it is processed for training purposes. Questionnaire results in data ranging from 0-3 are then normalized to a range of 0-1 to facilitate the machine learning process. Targets are also normalized in the 0-1 range so that descriptions are as follows Normal (0), Mild (0.25), Moderate (0.5), Severe (0.75), and Very Severe (1). As shown in Table I, the converted data to the 0-1 range so that the data is trained using the LSTM method.

TABLE I. EXAMPLE FOR DATASET

No. Resp.	List of Question											
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	…..	*20*	*21*	*Target*
1	0.10	0.37	0.10	0.37	0.10	0.10	0.10	0.10	……	0.37	0.10	0
2	0.63	0.37	0.37	0.37	0.37	0.37	0.37	0.37	……	0.37	0.37	0.5
3	0.63	0.37	0.37	0.10	0.37	0.37	0.10	0.37	……	0.37	0.90	1
4	0.37	0.37	0.10	0.10	0.37	0.37	0.37	0.37	……	0.37	0.37	0.25
……	……											
N												

IV. METHOD

In the model development process, this research uses several approaches and methods. The method will be described in detail in the following discussion.

A. Agile Methods

Why use agile in the model development process? Which is more effective, flexible, and adaptive to change? Hence, it is suitable for developing short-term software with occasional changes. That is what underlies this research using agile methods. Agile relies on a very high level of customer engagement in every project phase. Planning, design, development, testing, release, and feedback are in a constant cycle within defined periods [31]. The following are the stages of the Agile method :

1) Planning : This stage involves gathering information about the needs and goals of software development. The development team works closely with stakeholders to create specific, measurable, achievable development plans.

2) Analysis: The analysis phase involves an in-depth understanding of user needs and business requirements. The development team analyzes the information obtained at the planning stage to ensure that user needs and business requirements are met.

3) Design: The development team designs the software based on predetermined business needs and requirements at this stage.

4) Implementation: The implementation phase involves developing software using the technology and architecture designed in the previous stage. At this stage, the development team performs the software's coding, testing, and debugging. On this occasion, we found the correct parameter settings and a comparison of testing data with training.

5) Evaluation: The evaluation phase involves software testing and Validation. The development team tests the software functionality and ensures that the software runs well and meets business requirements. This evaluation ensures that digital counseling models can help students overcome mental health problems. At the same time, Validation can be done by involving students and counselors in the agreed model. The initial Validation carried out was checking the training results to produce the highest accuracy and checking the model with new data that had never been trained or recognized..

6) Launch: The launch phase involves deploying the software to the end users. The development team performs software installation and configuration to ensure that the software functions properly and can be used by end users. This process is carried out to determine whether the developed model is following the initial goals and objectives. It is accessible to students, can be used as analytical material for counselors, and can be helpful for parents and the community to provide information about their children's mental health.

7) Maintenance: The maintenance phase involves maintaining and repairing the software. The development team continues to monitor software performance and make improvements if there are problems or errors in using the software.

TABLE II. RESULT TEST PARAMETERS

Learning Rate/ Epoch/Weight	Results Test			
	Neuron	*Error*	*Testing Accuracy*	*Time (Second)*
0.005 Epoch 50 Weight : Random	125	0.0054	0.89	17.0944554
	150	0.0055	0.93	20.18729882
	175	0.0052	**0.96**	25.08185019
	200	0.0052	0.89	26.80664398
0.005 Epoch 100 Weight : Random	125	0.0061	0.86	5.225181222
	150	0.0057	**0.89**	6.400329693
	175	0.0057	**0.89**	7.338749521
	200	0.0068	**0.89**	8.041799094
0.005 Epoch 50 Weighted : Custom	125	0.0081	0.86	19.17301453
	150	0.0066	0.89	21.0382
	175	0.0055	**0.93**	24.11568326
	200	0.0081	0.86	26.69453782
0.005 Epoch 100 Weighted : Custom	125	0.0063	0.86	44.15530624
	150	0.0091	**0.89**	58.68121649
	175	0.006	**0.89**	67.67475449
	200	0.0088	**0.86**	81.66701722

B. Long Short Term Memory Network (LSTM)

There are many types of modifications of the RNN. Other RNN models include Elman RNN, Jordan RNN, and Fully RNN. LSTM is one of the most popular RNN developments in making predictions based on past information that has been stored for a long time. LSTM can remember a collection of information that has been stored for a long time, with the advantage of deleting information that is no longer relevant.

So that it is more efficient in processing, predicting, and classifying data based on a specific time sequence.

The advantage of LSTM over other RNNs is that they have multiple gates that can add to the information pool and combine it. There are four gates in the LSTM: forget gates, input gates, input modulation gates, and output gates. The four gates' functions are collecting, classifying, and processing data. As shown in Fig. 2, the difference between NN and LSTM architecture. LSTM networks are more complex, with multiple memory blocks in each hidden layer.

V. Result And Discussion

The test is carried out by comparing the training values with various tests such as 60:40, 75:25, 80:20, 90:10, resulting in a constant convergent graph at a ratio of 80:20. Then proceed with the analysis of the results of learning rates 0.01, 0.001, 0.075, 0.0075, 0.005, 0.0025, 0.0001 obtained convergent results at LR 0.005 (epoch 100) and LR 0.001 (epoch 100). At epoch values of 50 and 100. A good epoch is 100. The next stage compares 80:20 data tested with LR (0.01, 0.001, 0.005, 0.075). That results in a train accuracy of 92% and 26% testing for LR 0.001, while a train accuracy of 84% and 58% testing for LR 0.005. After fixing the parameter settings, the accuracy in recognizing new data that has never been trained is 96%. The results during training, the model can recognize data by 99% with LR 0.005, Epoch 50. As shown in Table II, the results of training and testing have a gap of 3%, which means that when testing, only one new data is not recognized. A decision can be issued if there is new data to be tested on the model. However, the decisions generated by the model must also be evaluated and monitored so that all data can be recognized. When new data is available, it can be retrained to be recognized. .

VI. Conclusion

Based on the mental health problems students face, exceptional intent guidance is needed for cases of depression that are not limited by time and space to serve and guide these youth to have a healthy mentality. For the consultation to be flexible, a digital counseling model was developed to assist counselors in the guidance process. The developed model has the benefit of assisting analysis, helping to make decisions, and providing information to counselors in counseling. As a result, the created model achieves 96% testing accuracy and 99% training accuracy. This means that it can detect the patient's mental health. The future research is to develop a model that can detect text or image-based patient mental health because the questionnaire is very formal and lengthy with a fertile, prosperous, broad, and inhabited by 300 million people. Indonesia is optimistic that it will gain a golden and advanced age in 2045.

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Digital Counseling

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Digital Counseling Model with Deep Learning for Mental Health of Vocational School Students

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Abstract**—** Indonesia is preparing to become a developed country in 2045, so it is essential to prepare infrastructure, policies, and human resources. Today's youth will be the spearhead for the next 20 years, so they must be well prepared. Not only smart, intelligent, and spiritually intelligent, but also has a good mentality. Maintaining mental health is very important to produce human resources who are physically and spiritually healthy. Surveys show that 10-20% of Indonesian youth have mental disorders. The causes of this problem can be internal and external, including the Covid pandemic. This research aims to develop a model that can help school counselors detect students' mental health quickly, precisely, and flexibly. The method used is observation, data collection by questionnaire, data analysis, model development, evaluation, testing, and dissemination of research results. This study resulted in a model developed with deep learning artificial intelligence (AI), which can provide information and detect mental health in students. After going through the stages and testing, a testing accuracy of 96% was obtained, which means the model can carry out digital-based counseling to students. The results can be trusted as a basis for psychologists to provide therapy if students experience depression. This model will significantly assist in the guidance process, which can be carried out flexibly at or outside school.

Keywords— depression, digital, counseling, models, AI

I. INTRODUCTION

Indonesia will be a developed country in 2045, so it is essential to prepare infrastructure, policies, and human resources. Today's youth will be the spearhead for the next 20 years, so they must be well prepared. Not only intelligent, intelligent, spiritually intelligent, but also has a good mentality. Maintaining mental health is very important to produce human resources who are physically and spiritually healthy. Surveys show that 10-20% of Indonesian teenagers experience mental problems. The causes of this problem can be internal and external, including the Covid pandemic. This research aims to develop a model that can help school counselors detect students' mental health quickly, precisely, and flexibly. The methods used are observation, data collection with questionnaires, data analysis, model development, evaluation, trials, and research results dissemination. The results of this study resulted in a model developed with artificial intelligence. Indonesia, with a population of 300 million people, has a very high chance of moving from a developing country to a developed country in 2045. The transition to becoming a developed country can be hindered due to the people's increasingly apprehensive mental health conditions, affecting national productivity. The youth generation is the nation's next generation who will become superior to human resources 20 years later. This generation must be prepared to be intelligent at heart, spiritually intelligent, and have a good mentality.

A survey conducted in 2022 on adolescents aged 10-17 years showed that 15.5 million (34.9%) Indonesian adolescents experienced mental problems, and 2.45 million (5.5%) adolescents experienced mental disorders. With the presence of COVID-19, adolescent mental health problems have increased again. Research in 2021 shows that 20% of the 250 million Indonesian people have the potential to experience mental health problems [2]. It means 1 out of 5 residents has the potential for mental disorders.

The mental health of children and adolescents is essential to maintain and pay attention to. This problem has become a hot topic of discussion because of the COVID-19 problem, which causes many students to experience mental problems such as anxiety, stress, and depression. This condition includes many adults who have experienced stress during the pandemic and post-pandemic. This mental health problem will affect academic achievement, resilience in dealing with problems or resilience, career, discipline, emotions, and quality of life [3].

Personal and family problems of students significantly affect their mental health. Parents who are very aware of their child's mental development try to care for and maintain their mentality since they are in the womb, born and grown. Parents are increasingly aware of their child's mental health by consulting a doctor or psychiatrist to check their child's mental

condition and hobbies and directing children according to their talents.

At school, the teacher/counselor, besides teaching, is also tasked with directing children's talents and interests through guidance at school. Assist children in solving problems faced at school and assist. However, through the author's observations, it is infrequent for children to use counseling services, so counselors at school do not know student progress. Every child's character and development cannot be considered the same.

Many children choose expertise programs not because they are happy but instead follow the advice of friends or parents [4]. With these conditions, children need more enthusiasm and attention to solve academic problems and achieve academic achievement. They need counseling to deal with the environment at school and home so that they can graduate on time, follow learning well, and excel.

With limited counseling services, it can be suggested to take part in online counseling services known as digital counseling. The dense class hours, curriculum changes, apprenticeship programs, entrepreneurship programs, assignments, and exams require good and prime mental health. Do not let students experience anxiety, stress, and depression. So it is necessary to conduct counseling whenever and wherever, even outside of school hours, to avoid disturbing their time and activities. Counseling can also be done flexibly from anywhere.

Unlike general high schools, vocational schools were chosen because they have expertise programs. Children who choose vocational schools are expected to get jobs according to their expertise. So school activities are busy, accompanied by a practicum in laboratories and workshops.

Students in vocational schools tend to face more pressure than regular schools. In addition to the pressure of mastering skills and expertise at the internship location, there are also several pressures due to work, economic problems, family, and academic demands. So that with these problems, a digital counseling model was developed that can be used to address mental health problems that they may experience from an early age.

II. LITERATUR REVIEW

A. *Student Mental Health*

Mental health is significant to pay attention to and keep sane. Good mental health is a condition of feeling calm and peaceful so that it is possible to enjoy life with gratitude and respect for the surrounding environment—that, of course, is very much needed by anyone, including students at school.

Mental health promotes physical, mental, and social well-being [5]. With a healthy mentality, students can explore their potential to the fullest and maximize their ability to face life's challenges. The most important thing is to complete all academic assignments correctly, master competence well, and avoid bad associations and environments. Able to control emotions well when dealing with friends, teachers, and the school environment.

If someone's metal has a problem, no matter how smart the teacher who teaches, it will not be accepted by students. They can commit violations, have harmful interactions, commit actions that harm themselves and the environment, and become public enemies.

What was surprising during the pandemic was that research [5] involved 235 respondents, the majority of whom experienced mild anxiety, as many as 99 students (42.13%) and moderate anxiety, as many as 38 students (16.17%). The research results related to stress levels showed that there were some students who experienced mild stress, namely 60 students (25.53%), related to depression levels, and 14 students (6.38%) experienced mild depression due to online learning during a pandemic.

How, then, do we talk about attitudes, character, achievements, or other things that should be obtained at school for high school students who usually experience hormonal fluctuations, change attitude, and require special attention? Research states that the number of students who experience stress is increasing, which often has adverse effects, such as bad grades during academic probation and emotional problems [3].

Especially vocational students sometimes experience anxiety about the future. This condition is also experienced by students abroad who are psychologically depressed and anxious, which affects daily life and can hinder academic activities [6]. Students need guidance and counseling services, especially during a pandemic with e-counseling technology. This service is needed to solve various kinds of mental problems in students at school [6].

This mental health problem is faced in various countries, not just Indonesia. Some cases experience severe depression that makes them isolate themselves from others, drop out of school, or, even worse, commit suicide. So that in Malaysia, remote mental health monitoring research has been developed to help facilitate early intervention and refer to counseling sessions to seek psychiatric help [7], [8].

Students in the first year experience various changes, so they can increase anxiety, stress, and depression by seeing a higher tone of voice, as in research conducted in Poland on dental medicine study programs [9]. The results of research on Chinese high school students are also at high risk of experiencing anxiety, while college students are at high risk of experiencing depression [10].

In addition to conditions at school that can cause mental problems, it turns out that adverse childhood experiences are also a significant determinant of depression in adolescence and adulthood, so services are needed that can help protect, prevent, and treat these mental problems [11].

Research in Selangor Malaysia found that in the scores for the five factors, 9.2% had a negative mood. 5% have interpersonal problems. 8.3% had ineffectiveness. 9.8% had anhedonia, and 10.6% had negative self-esteem. Female students are more stressed than male students [12].

Research in Ethiopia shows that students in rural areas experience problems, especially in women who chew gum, social phobia, depression, smoking, and being an alcoholic. Therefore, expanding mental health services to all secondary schools and strengthening counseling services is recommended [13]. Research in Bengkulu, Indonesia, obtained data that the majority of students who experience depression are women (56.3%), and the second (48.8%) are children who have 1-3 siblings [14].

B. Vocational School

A vocational school is an educational institution that offers vocational education or skills training programs to prepare students to work in specific fields, such as technology, construction, mechanics, beauty, tourism, etc. These programs usually provide practical training and focus on the technical and professional skills needed in the world of work. Vocational schools can be found in many countries and are often an alternative for students who want to enter the workforce more quickly or acquire the skills needed in specific fields.

So that the government launched various kinds of programs to support vocational education programs at both the high school and tertiary levels. In 2020, the Director General of Vocational Studies issued a fast-track program from Vocational Schools to Diploma 2 study programs [15]. Another program is the link and match of 400 study programs with industry, which at that time was only implemented by 133 study programs [16]. Another program being carried out is upgrading the Diploma 3 program to Diploma 4, which aims to provide opportunities for students to get a higher level of education to provide an excellent opportunity to fill essential positions needed by the industry with a new curriculum concept called Merdeka Learning and Merdeka Campus [17].

The demands for the vocational world are increasing daily, so it is necessary to improve teaching abilities, synergize, collaborate, revitalize, and teach factories with the industrial world to produce superior human resources[18].

With the motto of producing graduates ready to work, several changes have been made at Vocational Schools, including changing the vocational education curriculum. The developed curriculum must be relevant to the skills, challenges, and needs the industrial world to produce a curriculum that has a broad impact on the government; educational institutions and industry must work together to revitalize the approach and content of the curriculum so that it can be optimal through the support of the government, industry, and the independent learning-campus policy independent [15], [19], [20].

C. Student Resilience

Student resilience refers to students' ability to rise from the difficulties and challenges they face and remain optimistic and enthusiastic in the future. Resilience is coping with pressure and stress and staying positive, focused, and productive. Students who have a high level of resilience tend to have the ability to solve problems better, have better endurance in facing challenges, and have the ability to maintain good mental and emotional health.

Resilience is the process of adapting a person well in the face of adversity, trauma, tragedy, threats, or significant sources of stress [21]. Some factors that can affect student resilience are social support from family and friends, ability to solve problems, ability to adapt to change, ability to gain a good understanding of oneself and others, and ability to regulate emotions.

Students' levels of resilience can be increased through programs designed to improve social and emotional skills, as well as through support from family, friends, and teachers. Student resilience is often directed toward academics, known as academic resilience. This resilience is the success of students in achieving good educational results despite experiencing difficulties [21]. He development of technology and the current globalization make students critical, intelligent, clever, have many desires, get bored quickly, and do not know real problems because they only see them virtually.

Here it is necessary to instill a strong mentality and foundation because intelligence is about more than just getting big marks, and instantly, sometimes the attitude of parents who are not aware of it always directs children to get big marks. The most important thing is how to accompany, guide, and process so that children feel comfortable learning, and good grades are a bonus.

Based on observing the current social phenomena with more virtual communication, it is crucial to instill resilience in adolescents so that they become individuals who can face life's challenges and avoid stress, depression, and hostile behavior that harms them and their social environment [22].

D. Counseling

Cases of students and adolescents related to deviant behavior, smoking, drinking alcohol, bad behavior, immorality, fighting against teachers, fighting against lecturers, and fighting against parents. This condition makes a reflection that their mental health is in trouble. Whether it is because of past trauma, personal problems, romantic relationships, hormonal changes, being harassed, bullied, not considered, belittled, said severely and all the treatment they receive will make them brutal, undirected, anarchic, depressed, panicky, commit suicide, kill others, become boomers, and other problems that are even more sinister.

Schools and campuses are required to provide counseling services. Student counseling is a process in which a counselor works with students to help them solve personal, social, academic, or emotional problems. Counselors usually use interviews, observation, tests, and group discussions to help students understand their problems and find ways to solve them.

In Turkey, counseling volunteers have been prepared to assist with in-person and online counseling services to help more people [23]. ome of the problems a person faces at school, work environment, or residence when conditions cannot adapt to situations causing discomfort, anxiety, and stress, which, if prolonged, will lead to depression. Research shows that the situation at school due to personal or family problems can trigger stress [24]–[26].

There are several ways to do counseling, such as face-to-face and online. Unique conventional processes for patients with severe conditions. You can use chat, chat, email, and questionnaires in the initial consultation. After the initial process, the initial mental health condition of the patient will be seen so that he can proceed to therapy [27]–[30].

III. DIGITAL COUNSELING MODELS FOR MENTAL HEALTH

Developing a mental health counseling digital model for students is a process with a complex sequence of activities. Developing this model involves several entities, such as counselors, teachers, researchers, students, schools, and validators. This process has long stages, and each stage will

be explained in more detail. As shown in Fig. 1, the steps involved in developing the model are as follows.

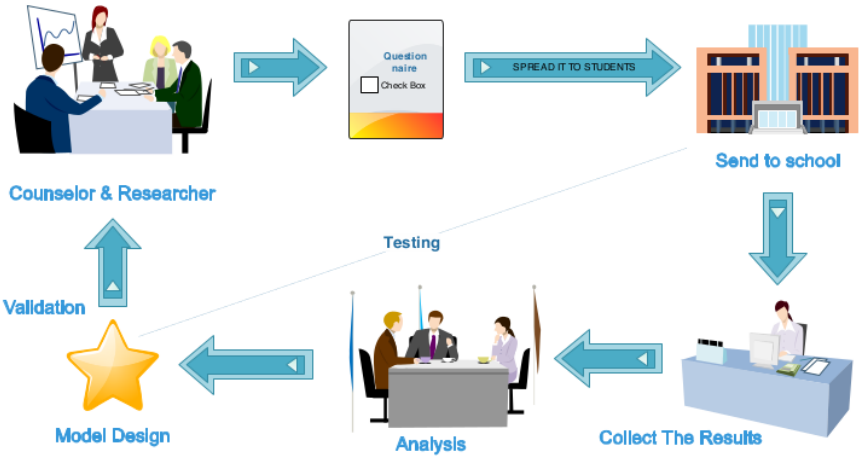

Fig. 1. Stages of Development of Digital Counseling Models for Students.

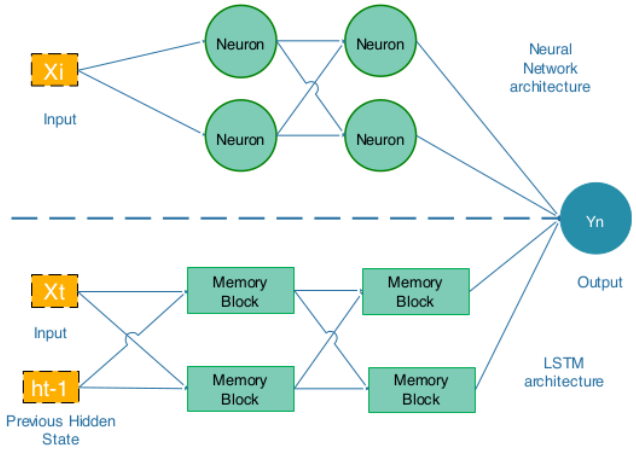

Fig. 2. Differences between NN and LSTM.

A. *Data Collection*

The data collection process was carried out at two SMKs, namely Bali Mandara Vocational High School, with an engineering background with three study programs, and Surya Medika Vocational School, which deals with health with two study programs. Further socialization will be carried out in July 2022; results will be recorded in September 2022. The questionnaire used is the DASS -21 (Depression et al.), with 21 items covering three physical, emotional/psychological, and behavioral variables. The results can show the levels, namely: normal, mild, moderate, severe, and extremely severe.

B. *Data Analysis*

After the data is collected, the next step is to analyze the data. This data will help in identifying trends and patterns. From October to November, an assessment and data analysis was carried out. The data collected was 145 with five classifications, namely Normal, Mild Depression, Moderate Depression, Severe Depression, and Very Severe Depression.

Based on the questionnaire used, there are several types of questions that lead to Depression, such as the following example :

- I cannot feel any positive feelings at all.

  Select Score : (never experienced 0 1 2 3 Often)

- I do not seem enthusiastic about doing an activity anymore.

  Select Score : (never experienced 0 1 2 3 Often)

The standard calculation formula in DASS-21 has attributes in the form of 21 questions that must be answered. Then it is calculated by adding up the scores on the questionnaire items, so three types of score classifications are obtained, namely Depression, Anxiety, and Stress. The following dataset used is the classification of Depression only.

Data was obtained by questionnaire in the form of numbers / numeric. Then it is processed for training purposes. Questionnaire results in data ranging from 0-3 are then normalized to a range of 0-1 to facilitate the machine learning process. Targets are also normalized in the 0-1 range so that descriptions are as follows Normal (0), Mild (0.25), Moderate (0.5), Severe (0.75), and Very Severe (1). As shown in Table I, the converted data to the 0-1 range so that the data is trained using the LSTM method.

TABLE I. EXAMPLE FOR DATASET

No. Resp.	List of Question											
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	.....	*20*	*21*	*Target*
1	0.10	0.37	0.10	0.37	0.10	0.10	0.10	0.10	.....	0.37	0.10	0
2	0.63	0.37	0.37	0.37	0.37	0.37	0.37	0.37	.....	0.37	0.37	0.5
3	0.63	0.37	0.37	0.10	0.37	0.37	0.10	0.37	.....	0.37	0.90	1
4	0.37	0.37	0.10	0.10	0.37	0.37	0.37	0.37	.....	0.37	0.37	0.25
.....	.....											
N												

IV. METHOD

In the model development process, this research uses several approaches and methods. The method will be described in detail in the following discussion.

A. Agile Methods

Why use agile in the model development process? Which is more effective, flexible, and adaptive to change? Hence, it is suitable for developing short-term software with occasional changes. That is what underlies this research using agile methods. Agile relies on a very high level of customer engagement in every project phase. Planning, design, development, testing, release, and feedback are in a constant cycle within defined periods [31]. The following are the stages of the Agile method :

1) Planning : This stage involves gathering information about the needs and goals of software development. The development team works closely with stakeholders to create specific, measurable, achievable development plans.

2) Analysis: The analysis phase involves an in-depth understanding of user needs and business requirements. The development team analyzes the information obtained at the planning stage to ensure that user needs and business requirements are met.

3) Design: The development team designs the software based on predetermined business needs and requirements at this stage.

4) Implementation: The implementation phase involves developing software using the technology and architecture designed in the previous stage. At this stage, the development team performs the software's coding, testing, and debugging. On this occasion, we found the correct parameter settings and a comparison of testing data with training.

5) Evaluation: The evaluation phase involves software testing and Validation. The development team tests the software functionality and ensures that the software runs well and meets business requirements. This evaluation ensures that digital counseling models can help students overcome mental health problems. At the same time, Validation can be done by involving students and counselors in the agreed model. The initial Validation carried out was checking the training results to produce the highest accuracy and checking the model with new data that had never been trained or recognized..

6) Launch: The launch phase involves deploying the software to the end users. The development team performs software installation and configuration to ensure that the software functions properly and can be used by end users. This process is carried out to determine whether the developed model is following the initial goals and objectives. It is accessible to students, can be used as analytical material for counselors, and can be helpful for parents and the community to provide information about their children's mental health.

7) Maintenance: The maintenance phase involves maintaining and repairing the software. The development team continues to monitor software performance and make improvements if there are problems or errors in using the software.

TABLE II. RESULT TEST PARAMETERS

Learning Rate/ Epoch/Weight	Results Test			
	Neuron	*Error*	*Testing Accuracy*	*Time (Second)*
0.005 Epoch 50 Weight : Random	125	0.0054	0.89	17.0944554
	150	0.0055	0.93	20.18729882
	175	0.0052	**0.96**	25.08185019
	200	0.0052	0.89	26.80664398
0.005 Epoch 100 Weight : Random	125	0.0061	0.86	5.225181222
	150	0.0057	**0.89**	6.400329693
	175	0.0057	**0.89**	7.338749521
	200	0.0068	**0.89**	8.041799094
0.005 Epoch 50 Weighted : Custom	125	0.0081	0.86	19.17301453
	150	0.0066	0.89	21.0382
	175	0.0055	**0.93**	24.11568326
	200	0.0081	0.86	26.69453782
0.005 Epoch 100 Weighted : Custom	125	0.0063	0.86	44.15530624
	150	0.0091	**0.89**	58.68121649
	175	0.006	**0.89**	67.67475449
	200	0.0088	**0.86**	81.66701722

B. Long Short Term Memory Network (LSTM)

There are many types of modifications of the RNN. Other RNN models include Elman RNN, Jordan RNN, and Fully RNN. LSTM is one of the most popular RNN developments in making predictions based on past information that has been stored for a long time. LSTM can remember a collection of information that has been stored for a long time, with the advantage of deleting information that is no longer relevant.

So that it is more efficient in processing, predicting, and classifying data based on a specific time sequence.

The advantage of LSTM over other RNNs is that they have multiple gates that can add to the information pool and combine it. There are four gates in the LSTM: forget gates, input gates, input modulation gates, and output gates. The four gates' functions are collecting, classifying, and processing data. As shown in Fig. 2, the difference between NN and LSTM architecture. LSTM networks are more complex, with multiple memory blocks in each hidden layer.

V. Result And Discussion

The test is carried out by comparing the training values with various tests such as 60:40, 75:25, 80:20, 90:10, resulting in a constant convergent graph at a ratio of 80:20. Then proceed with the analysis of the results of learning rates 0.01, 0.001, 0.075, 0.0075, 0.005, 0.0025, 0.0001 obtained convergent results at LR 0.005 (epoch 100) and LR 0.001 (epoch 100). At epoch values of 50 and 100. A good epoch is 100. The next stage compares 80:20 data tested with LR (0.01, 0.001, 0.005, 0.075). That results in a train accuracy of 92% and 26% testing for LR 0.001, while a train accuracy of 84% and 58% testing for LR 0.005. After fixing the parameter settings, the accuracy in recognizing new data that has never been trained is 96%. The results during training, the model can recognize data by 99% with LR 0.005, Epoch 50. As shown in Table II, the results of training and testing have a gap of 3%, which means that when testing, only one new data is not recognized. A decision can be issued if there is new data to be tested on the model. However, the decisions generated by the model must also be evaluated and monitored so that all data can be recognized. When new data is available, it can be retrained to be recognized. .

VI. Conclusion

Based on the mental health problems students face, exceptional intent guidance is needed for cases of depression that are not limited by time and space to serve and guide these youth to have a healthy mentality. For the consultation to be flexible, a digital counseling model was developed to assist counselors in the guidance process. The developed model has the benefit of assisting analysis, helping to make decisions, and providing information to counselors in counseling. As a result, the created model achieves 96% testing accuracy and 99% training accuracy. This mean that it can detect the patient's mental health. The future research is to develop a model that can detect text or image-based patient mental health because the questionnaire is very formal and lengthy with a fertile, prosperous, broad, and inhabited by 300 million people. Indonesia is optimistic that it will gain a golden and advanced age in 2045.

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Digital Counseling

ORIGINALITY REPORT

18%	16%	12%	10%
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