

# MAIN CONFERENCE



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**NEW TRENDS  
& APPROACHES  
IN HIGHER EDUCATION**



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MAIN CONFERENCE

# PROCEEDING

of the 2021 International Multidisciplinary Conferences  
on Productivity and Sustainability

*“NEW TRENDS & APPROACHES IN HIGHER EDUCATION”*

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2022

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## PREFACE

2021 International Multidisciplinary Conference on Productivity and Sustainability or IMPS, is a meaningful event to close the Universitas Kristen Krida Wacana's 55<sup>th</sup> Anniversary and the year with a celebration of education, of science.

Most of us might agree that the COVID-19 pandemic has changed the way people live in general, in many aspects of life including education. We have heard so much information and predictions of what education will look like after the pandemic. I reflect on this question myself as a learner, an educator, what have I done in my practices as a learner, as an educator to reflect a change needed during the pandemic and afterward?

To some extent, the global pandemic has made me, maybe most of us aware that what is expected of us is not completely new. What we should do now as a learner and an educator, should have been done a long time ago, but we did not, in a way, because of some excuses, our perceived limitations. The pandemic has thought us to be more resilient, more collaborative, and participative in our approaches. Higher education and learning need more flexibility in time, place, and pace. We should no longer be constrained by where we teach or where we study as the world has become more borderless. There is almost no limit as to how much information we can get from home at our speed. At the heart of the matter is, as educators how we can strengthen our methods and practices, in teaching, learning, researching, and think of their applicability to transform other people's lives.

This 2021 IMPS is a marker, a small step that UKRIDA and its partners, Seattle Pacific University and National Formosa University make to suggest that the international collaboration has become more viable amidst the crisis. To see the pandemic from a new light, it is to mark a period in history that education and internationalization efforts can be achieved from home. It has become the driving force for improving our capacity to operate remotely and work more productively. A reminder that it is part of our responsibilities to make education and world resources more sustainable and accessible for many through different forms of cross-national collaborations.

In the wake of this global pandemic, it becomes even more imperative that HE institutions should jointly overcome the political, economic, and sociocultural hegemony (Rasikawati et al., 2021). That is also to say that HE institutions should be more socially responsible toward their international approaches and measures to stimulate global learning for all.

The abstracts documented in this proceeding reflect on different multidisciplinary perspectives from five countries, Indonesia, the Netherlands, Singapore, Thailand, and the U.S on higher education practices and research during and after the pandemic. It may not



capture all the dialogues that occurred during the conference but document some important research findings and hope for a better higher education.

**Ira Rasikawati, Ph.D.**  
**2021 IMPS General Chair**

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# EXPERIENCE OF ADAPTATION TO COVID-19: WHAT HELP FACULTY RESPOND EFFECTIVELY TO ONLINE LEARNING

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## Abstract

The COVID-19 pandemic has resulted in the suspension of face-to-face teaching in the full-time Master's in medical education programme, the Centre for Medical Education, University of Dundee. It is unknown how adaptive and resilient the teaching staff are towards the sudden change of mode of delivery and how the face-to-face students have perceived this change.

The qualitative study with a grounded theory approach was designed to explore and theorise the framework of teaching staff's adaptation and resilience in utilising technology to meet student needs and maintain good educational quality by using semi-structured individual interviews. The group interview was used to explore this programme's students about their perceptions of staff's adaptation in the current disruptive circumstances.

The important findings of how faculty teaching staff at CME have responded to the COVID-19 pandemic, especially in relation to seven face-to-face students in the programme, and students' feedback are presented. A consequential/conditional matrix depicts the study phenomenon and relationships of each evolving core category, as evidenced by the faculty teaching staff and student interview results (Fenwick, Chaboyer, & St John, 2012). The environmental support, peer support and care of faculty teaching staff influenced how they adapt and be resilient to work impact, as did the previous online teaching experience. Three parts of the educational aspects are considered as results of their adaptability and resilience: teaching, cognitive, and social presence (Edwards, Perry, & Janzen, 2011). The staff members agreed that there was a need to increase the sense of community for social presence. In this aspect, the student participants also reported feeling less engaged and interacting with one another. Furthermore, when students encountered each other online, they felt like strangers and were hesitant to contribute ideas during discussions or ask for peer help. However, previously built relationships before lockdown helped to mitigate that sensation.

The findings imply that one goal of teaching staff adaptation is to re-establish a sense of community. Students' sense of community and belonging can be transferred from face-to-face to online delivery.

**Keywords:** Online learning, COVID-19, Medical education, Adaptation, Resilience

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# **SOCIAL AND TEACHING PRESENCE IN CoI FRAMEWORKS: APPLICATION AND OBSERVATION OF COMMUNITY OF INQUIRY IN LANGUAGE CLASSROOMS**

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## **Abstract**

Community of Online Inquiry (CoI) has been used in education for over two decades, but its application becomes even more critical during a pandemic. The purpose of this article is to present the preliminary findings of a study that is currently being conducted within the Community of Inquiry framework. The researchers apply selected instructional activities proposed by Fiock (2020) to fifty EFL learners at the higher education level, with a focus on social presence and teaching presence. This study uses three online platforms to develop CoI in the class: Zoom, Padlet and Google Slides. The students were asked to complete a questionnaire consisting of checkboxes and short answer questions in order to see the perceived effects of the instructional strategies in the CoI framework in their classroom, followed by an interview. The reported positive effects of implementing instructional strategies imply that CoI frameworks are effective at fostering a sense of community in learners, which allows them to direct their learning. Social and teaching presence in this context thus far help to improve students engagement as well. As quoted from Garrison, students recognize that they are not in the classroom there for purely social reasons. It is of less importance if the learning activities are information acquisition only and no collaborative assignments where students can benefit from the perspectives of others (2019). Teaching presence is chosen due to the consensus is that teaching presence is a significant determinant of student satisfaction, perceived learning, and sense of community (Garrison, 2019) An important aspect of implementing CoI in this research context is that the learners should be well-informed of the instructional design and the learning objectives so that they know how, when, and where to participate as a member of the online community.

**Keywords:** CoI, social presence, teaching presence

# SUPPORTING STUDENTS TO STUDY SMART – A LEARNING SCIENTIST PERSPECTIVE

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## Abstract

In higher education, students need to self-regulate their learning: They need to plan how to approach learning goals, monitor understanding and control their learning by choosing effective learning strategies. In self-regulated learning (SRL), cognitive and metacognitive strategies are used to process information, and monitor and control understanding. Resource-management strategies are used to manage external and internal resources, such as time, effort and motivation. While research in cognitive psychology has revealed highly effective learning strategies for long-term learning, such as practice testing and distributed practice, 60-80% of students in higher education use rather ineffective learning strategies, such as rereading or highlighting. With the aim to support students in using more effective learning strategies during their self-study, we developed a learning strategy training for first-year students, called 'Study Smart'. In this presentation, I will share insights from our research on the Study Smart training program and research on students' adaptation to emergency remote education during the Covid-19 pandemic. The Study Smart training program consists of three sessions in small peer-groups aiming to make students more aware about which strategies are effective and why, support them in practicing effective strategies and stimulates reflection on their self-study. A first mixed-methods study with 49 first-year students showed that the training program improved students' metacognitive knowledge and the use of quizzing. However, insights from qualitative data analysis revealed that students experienced uncertainty about the exact time and effort these effective, but more effortful strategies would cost and how to apply these in their specific study context. Strong habits of using ineffective learning strategies prevented students to effectively change their study strategies (Biber, oude Egbrink, Aalten, & de Bruin, 2020). Based on the insights of this first study, we continuously redesigned and evaluated the program throughout the years and formulated challenges and futures steps when implementing such a training for all first-year students (Biber, de Bruin, Schreurs, & oude Egbrink, 2020). Besides metacognitive and cognitive learning strategies, resource-management strategies are important to adapt one's resources to changes in the environment and create optimal circumstances to learn. The ongoing Covid-19 pandemic posed a challenge to all students when suddenly required to study from home. We examined how students adapted to this emergency remote education focusing on their resource management strategies. Students were on average less able to regulate their attention, effort and time and were less motivated to study. However, there were differences between the students identified using a *k*-means cluster analysis. A small group of 'adapters' appreciated the increased level of autonomy and improved their self-regulation. Other students, such as 'the overwhelmed' or 'the surrenderers' were much less motivated to study than before the crisis and less able to regulate their effort, attention and time (Biber et al., 2021). Our research shows that a formal learning strategy program can enhance students' knowledge and use of effective learning strategies, but more individual support is

needed to take individual differences into account and ensure the uptake of effective learning strategies long-term.

**Keywords:** self-regulated learning, learning strategies, higher education, metacognition, educational design research

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# SUSTAINABILITY OF TEACHING & LEARNING IN OPTOMETRY DURING COVID-19

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## Abstract

**Introduction:** The Diploma in Optometry at Ngee Ann Polytechnic, Singapore is a 3-year program with an intake of 40 students per year, who are mainly 'O' level graduates. The course trains the students in the assessment of visual functions including visual acuity, refraction, binocular vision, contrast sensitivity, and colour vision, besides the anterior and posterior ocular health, leading to the diagnosis and advice on treatment. The course also provides the students with the knowledge of contact lenses, spectacle frames and ophthalmic lenses, to prescribe appropriate optical aids for the patients.

**Objectives:** To avoid cross contamination and delaying students' learning during the period of COVID-19.

**Methodology:** When face-to-face sessions were not allowed, all lectures and tutorials, with some practical sessions were conducted online. For clinical skills with a very close proximity to the patient, for example direct ophthalmoscopy, the students viewed the demonstration videos online and posted their written reflections on their learning. The students also posted videos taken of themselves practicing the clinical skills on their family members, for the lecturer to review and provide them with comments/feedback for improvement. During the online face-to-face sessions, the lecturer could demonstrate, for example, contact lens insertion/removal techniques, and the students were to perform return demonstration to the lecturer for feedback. All students and lecturers would have the face masks on at all times for any face-to-face sessions in campus with restriction of 5 students/group without any interaction between the student groups. The lens racks or phoropters were used for refraction instead of trial lenses and trial frame. Face shields were installed on the slit-lamp biomicroscopes. Fundus photography was used in place of direct ophthalmoscopy to assess patient's posterior ocular health at the Ngee Ann Polytechnic Optometry Centre (NPOC), which is an in-campus training centre for public to have their eye examination.

A variety of IT tools were utilized for the students' online learning, including tools for communication, collaboration, learning management, and a video platform to host the teaching videos. Kaltura capture was one of the tools used for recording of teaching videos and could allow the inclusion of questions for formative assessment and students' self-evaluation of understanding. The teaching videos were then consolidated either in iVid2 or YouTube channel for students' seamless access. Students would submit videos of return demonstrations for lecturer's feedback after learning through the teaching videos. A game-based digital tool Virtual Optometrist was used to present different real-world clinical scenarios for authentic learning to complement the training at the NPOC. Online assessment through e-proctoring were

facilitated with MS teams, Zoom, and learning management MEL. A design thinking project using MOOCs and online collaboration were implemented when face to face internship was disrupted due to Covid-19 safe management measures.

**Conclusion:** During COVID-19 period, the classes continue to be online and practical sessions face-to-face with safe management measures in place. Teaching and learning continue with various IT platforms.

**Keywords:** COVID-19, teaching and learning, optometry

# THE TRIPLE HELIX MODEL AND BUSINESS SUSTAINABILITY: EXISTENCES, CHALLENGES AND HOPE

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## Abstract

Indonesia faces many national challenges, such as disparity, poverty, import dependence, a low Human Development Index and a low Competitiveness Index. The challenges also exist in education, such as low educational attainment of 25-34 year-olds, the low projected of graduates with STEM degrees across OECD and G20 countries in 2030, the low of Research and Development expenditure as a percentage of GDP (GERD) in 2020; and public sector dominate GERD expenditure up to 90%. The problem is whether Indonesia can face and overcome by collaborating between the government, universities and industry/business. For this reason, research is carried out with a qualitative approach to identify the existence and challenges of this collaboration. Is there new hope that emerges from the MBKM policies and programs by the ministry of education, culture, research and technology for the continuity and strengthening of this collaboration? Survey several resource persons with teaching backgrounds, officials at public and private universities, and the industrial world from various regions in Indonesia. This research finds the existence, challenges and hopes for collaboration with the triple helix model. Applying the triple helix model concerning business sustainability in Indonesia still faces many challenges. The challenges include the forms and ways of collaboration from universities, government and business or industry, and the individual components. In collaboration, there is a consistent link and match, complementing each other and improving the quality of collaboration. The pattern of collaboration is still sporadic, unsustainable, not integrated, and even disharmony issues often arise. Universities generally have limited funds, human capital, basic research activities, and applied research. On the other hand, the business trust in collaborating with education institutions, using research and education results from universities, still plagues the world of industry and business. The government is still slowly trying to integrate and institutionalize existing collaborations through law enforcement, funding research activities. A tiny new hope emerged when the ministry of education, culture, research and technology launched the MBKM program for universities in Indonesia to collaborate with the industrial world through their shops. That hope will be lit even more strongly when there is a joint roadmap, especially industry, universities and the government in research and education activities that lead to innovation and entrepreneurship for those who collaborate. Institutions such as the kedaireka are one of the essential steps to break the deadlock of collaboration that has occurred so far; In addition, a joint research roadmap is needed in collaboration so that the application of the triple helix model can be sustainable, integrated, complementary and profitable each other, and even strengthen the collaboration itself.

**Keywords:** triple helix model, existences, challenges, hope, business sustainability

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# NAVIGATING DISRUPTION IN TIMES OF CRISIS" EQUITY AND SOCIAL JUSTICE IN HIGHER EDUCATION

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## **Abstract**

The global pandemic highlighted the unpredictability and rapid change that higher ed institutions are susceptible to but are rarely prepared for. Characteristically slow to change, academic institutions are steeped in traditions that may stymie proactive strategic plans to navigate turbulent market shifts. As witnessed during the pandemic, universities not only scrambled to adapt to state mandated, social distance COVID protocols, but also institute remote learning instruction to avoid disruption of their pedagogical services. Online pedagogical tools and practices that have long been advocated for to address accessibility challenges and improve service for the most vulnerable and marginalized students, became the theme of the day. As the pandemic raged on, equity and social justice issues around race, socio-economic status, and ability erupted to create the perfect storm. This talk explores how the pandemic fostered an urgent demand for higher ed institutions to look inward, assess the way they deliver academic services to their pandemic-tested student base, and adapt to keep their institutions afloat.

## **Keywords**

## **References**

# **ARTS EDUCATION AND SOCIAL EMOTIONAL LEARNING (SEL): INEXTRICABLE AND COLLABORATIVE CONNECTIONS**

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## **Abstract**

What exactly is arts education? What is social-emotional learning? How are art education and social-emotional learning inextricable and collaborative connections? Why is this important for new trends and approaches in higher education? These four essential questions are the foundation for this abstract, supported by definitions, figures, and references.

Arts education is defined as courses in dance, media arts, music, theatre, and visual arts, in Washington State education law, as well as in United States of America (USA) federal law (United States Department of Education [USDOE], 2015; Washington State Legislature [WSL], 1993; 2004/2006/2011; 2014), is basic, core, academic, and essential learning education, as well as a high school graduation requirement, and necessary for a well-rounded education for the whole child (State Education Agency Directors of Arts Education [SEADAE], 2020). The Office of Superintendent of Public Instruction (OSPI), which is the education agency in Washington State, USA, defines social emotional learning (SEL) in the following paragraph and alignment with the Collaborative for Academic, Social, and Emotional Learning (CASEL), model framework (Collaborative for Academic, Social, and Emotional Learning [CASEL], n.d.). Social Emotional Learning: SEL is the process through which all young people and adults acquire and apply the knowledge, skills, and attitudes to develop healthy identities, manage emotions and achieve personal and collective goals, feel and show empathy for others, establish and maintain supportive relationships, and make responsible and caring decisions. (Office of Superintendent of Public Instruction [OSPI], 2021b, p. 127) Figure one illustrates the CASEL model in the CASEL wheel, representing the five broad and interrelated areas of SEL competence which are: self-awareness, self-management, social awareness, responsible decision making, and relationship skills (CASEL, n.d.). All of these skills are necessary for personal and professional success, and all of these skills are inextricably characteristic in the arts disciplines of dance, media arts, music, theatre, and visual arts, as well as connections within and across the arts, and to other disciplines, life, cultures, and work (Ellis & Fouts, 2001; OSPI, 2011/2014; OSPI, 2021a).



Figure 1: Interactive CASEL Wheel illustrating the CASEL five broad and interrelated areas of SEL competence. URL: [What Is the CASEL Framework? - CASEL](#)

The following quote captures the inseparable connections between the arts disciplines and SEL: Arts education is essential, and will continue to provide social, emotional, cognitive, physical, and mental health to any and all who participate and express their learning in creative ways—virtually or in person. Persons experiencing and engaging in instructional opportunities through dance, media arts, music, theatre, and visual arts—via the universal nature of the artistic processes of creating, performing, presenting, producing, responding, and connecting—create a sense of normalcy, possibility, community, and hope during this challenging and uncertain time in history [COVID-19 pandemic]. (Joseph, 2020c, p.73)

Joseph (2020c) stressed the importance of addressing the negative impact of the pandemic—specifically the effects on students intellectually and cognitively—citing the need for the accessibility of arts education in virtual, hybrid, and in-person instructional models to address how students, educators, and parents were experiencing “emotions of sadness, anxiety, loneliness, trauma, depression, fear, and anger from not being able to go to school, be with their friends, and experience the traditions and activities of the school, summer vacation, work, and social life” (p. 73).

Figure two illustrates the afore referenced emotions via a Washington State visual arts performance assessment adaptation given during the spring of 2020, and in the midst of the pandemic. The middle school student’s rendition of her self-portrait is clearly illustrated as one imprisoned in despair and

detailed on the bars encasing the self-portrait. Her honesty and expressed detail are evidence of all five strands of the SEL CASEL model.

The visual and performing arts have been cited by other researchers and educators, as well, as effective methods and strategies to address the social and emotional needs and the five SEL interrelated areas of the CASEL model in students and adults alike (CASEL, n.d.; Edgar & Morrison, 2020; Elias, 2020; Farrington, et al., 2019; Foster-Griffin, 2021; Gewertz, 2019). Physiologically, music making via singing and playing instruments naturally impacts the vagus nerve (Gould, 2019); whereas, deep breathing, humming, singing, chanting, choral singing, and humming and blowing into instruments automatically ignites the vagus nerve in positive ways, as well as exhibits joy, hope, and happiness in those experiencing the making of music. Joseph (2020a, 2020c) presented and wrote, “This action creates a natural buzzing sensation in the lips, mouth, and nose area, and easily activates singing; thus, relaxing the parasympathetic nervous system” (p. 71).

People are inherently programmed to move and dance; sing, make, play, improvise, and compose music; act, pretend, role-play, and engage in creative dramatics; create, draw, mold, sculpt, and imagine; and play with imagining—arts for “art’s” sake, integrated arts, and arts in the content areas or interdisciplinary arts (Joseph, 2019), including writing and speaking where language arts skills are integrated into all of the five arts disciplines referenced. Regarding dance and movement, there are eight movements or patterns that babies make from birth through twelve months—master by age two—and need to experience on a daily basis for optimal health and wellness from birth through life (Gilbert, 2006). According to Gilbert (2006), these eight movements or patterns are experienced from the moment of birth, beginning in sequence with breath, touch or tactile, core-distal, head-tail, upper-lower, body-side, cross-lateral, and vestibular (Gilbert, 2006). These patterns envelop the arts resulting in social-emotional well-being. The intentional sequence of these eight patterns in a myriad of ways—such as lying down on one’s back or stomach, sitting, or standing—has a positive impact on the nervous system—resulting in the mind-body connections of somatic experiences (Eddy, 2016).

Higher education is a catalyst for raising awareness of the inextricable and collaborative connections of arts education and social-emotional learning, including the investigation, research, and study of the implications of these connections via qualitative and quantitative research, observations, and personal interviews with various age subsets. Arts education and social-emotional learning influences regarding the social, emotional, cognitive, physical, affective, physiological, and psychological effects of all ages—birth through life—are imperative for the current and future health and well-being of our society—specifically at this time in history. Arts and social-emotional learning have the potential to impact and communicate in creative and visionary ways for the benefit of all mankind.



Figure 2: Middle school student (Grade eight, age 13-14) artwork adaptation of a Washington State Arts Performance Assessment 'The Real You' adapted to 'The Real Me, 2020', with student reflection or artist's statement written on the bars and keys as a part of the artwork (Joseph, 2020b, p. 28; OSPI, 2003, 2006, 2008, 2011, 2015, 2018, 2019).

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# **RELIGIUS, SPIRITUAL, OR ROHANI? A STUDY ON GOOGLE TRENDS**

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## **Abstract**

In scientific literature, experts debate the terms such as religiosity and spirituality. Cultural context needs to be considered in the comparative study of religion to understand the meaning of religiosity and spirituality (Keller, Klein, Swahajor-Biesemann, Silver, Hood, & Streib, 2013). A study by Novianty & Garey (2020) found that religiosity/spirituality have a similar meaning and was more oriented to institutional forms of religion rather than personal among early adult individuals in Indonesia. In the Indonesian language, the term spiritual is also related to the term *rohani*. The study is needed to know how individuals in Indonesia are familiar with and use terms such as *religius* (religious), *spiritual* (spiritual), and *rohani*. The study goal is to understand what terms people in Indonesia are interested to use in daily life. Data used in this study was from Google Trends. Google Trends has been used by researchers to study religion (Bentzen, 2020; Yeung, 2019). The terms used in this study were *religius*, *spiritual*, and *rohani*. The search area was limited in Indonesia and the time search was limited in the last five years (May 2016 – May 2021). Categories used in this study were all categories and the search was conducted by web search. Analysis was conducted in three steps. First by looking at interest over time data in Google Trends (Google, 2021a). The second was analyzing search terms based on geographical areas or regions in Indonesia (Google, 2021b). The third was analyzing the relations of those terms with other terms (Google, 2021c). This study found that people in Indonesia were more interested in the term *rohani*-, especially in Google search compare to *religius* and *spiritual*. Based on the findings, the term *rohani* was more popular across all regions in Indonesia compared to *religius* and *spiritual*. This study also found that the term *rohani* was more related to specific searches such as nuanced religion song (*lagu rohani*) while *religius* and *spiritual* were more related to information seeking search about the meaning of those terms (*religius adalah; spiritual adalah*). Findings in this study showed that the term *rohani* was the most popular term for people across all regions in Indonesia. It can be said that people were more interested to know about the term *rohani* compared to *religius* and *spiritual* in web search. Thus, this finding may give a clue about *rohani* as a more contextual term in Indonesia. Limitations of this study are related to information about the individuals who search those terms in web search since Google did not provide any data about the demographic of the individuals who used its service. Future study needs to address this issue to understand individual religious affiliation, gender, age, education, etc., and how they are related to the term *rohani*. Findings from this study must be regarded carefully since they did not reflect individual preferences. There may be a possibility that people who are not religious, search for religious terms and vice versa (Yeung, 2019). Thus, the popularity of the term *rohani* only showed its position in online search compared to *religius* and *spiritual*.

**Keywords:** religius, spiritual, rohani, Google, Google Trends

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# PREVALENCE OF HIGH BLOOD PRESSURE IN MALE VEGETABLE FARMERS WITH PRIMARY EXPOSURE TO CHLORPYRIFOS IN CENTRAL JAVA, INDONESIA

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## Abstract

According to the 2018 Indonesian Basic Health Research (RISKESDAS) report, the prevalence of hypertension in people aged  $\geq 18$  years was 34.1%. Nevertheless, as one of the most common non-communicable diseases, it is unclear whether the prevalence in the agricultural population differs from the national prevalence, and whether there are occupational factors associated with the development of hypertension in vegetable farmers. The current study aimed to determine the prevalence of high blood pressure (BP) and its contributing factors in male vegetable farmers with primary exposure to chlorpyrifos. This cross-sectional study was conducted in the vegetable farming area in Central Java, Indonesia from July to October 2020. All eligible participants were recruited consecutively, therefore a total of 172 male vegetable farmers aged 18-65 who had been actively using CPF for at least one year participated in this study. A structured interviewer-administered questionnaire was used to obtain the sociodemographic and occupational characteristics of the participants. Participants' blood pressure was measured using an upper arm digital blood pressure monitor. High blood pressure (BP) was defined as a systolic BP  $\geq 140$  mmHg and/or a diastolic BP  $\geq 90$  mmHg. The difference in the characteristics of the study population according to the BP group was analyzed using the Chi-square test and Mann-Whitney test. Logistic regression analysis was performed to examine the association between BP and its contributing factors. All p values are two-sided, with significance considered at  $p < 0.05$  for these tests. The prevalence of high blood pressure in the present study was 45.9%. Approximately 21.5% of the participants reported not using any personal protective equipment (PPE) during their agricultural activities. Inversely, more than 90% reported using multiple pesticides. The median daily work duration, frequency of pesticide application, and the volume of pesticides applied did not differ significantly between the BP groups. BMI  $\geq 25$  Kg/m<sup>2</sup> (OR 2.80; 95% CI 1.13-6.94), age  $>50$  years (OR 2.99; 1.29-6.92), and spraying pesticide during the daytime (OR 5.66; 1.03–31.30) were found to be associated with high BP in the logistic regression analysis. The prevalence of high BP in this study was higher than the national prevalence in Indonesia. Farmers aged  $>50$  years, obese, and spraying during the daytime were associated with high BP. Although there was no association of exposure level with high BP in this study, the occupational characteristics identified, highlight the need for farmers to practice proper pesticide handling, wear proper PPE, and have their health monitored regularly as well as warrant further studies to investigate the causal relationship between CPF exposure and high BP. A cross-sectoral collaborative education program to address the need for controlling pesticide exposure to farmers will be very beneficial.

**Keywords:** farmer, hypertension, pesticide exposure, work practice

# EFFECTIVE CUSTOMER CHURN PREDICTION USING ENSEMBLE TECHNIQUE

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## Abstract

Customers are the most important asset of any type of business. Business prospects are only possible with the presence of satisfied customers who are always loyal and build their relationship with the company. The Customer Relationship Management (CRM) system aims to help, maintain, manage, and improve loyal customer relationships, also known as the Churn management process. Predicting the likelihood of customer churn before the customer does so, so providers can pay attention to minimizing their likelihood of churn by entering textual data into the customer churn prediction model (CCP). We have utilized a total of 10,000 datasets with 14 attributes, before exploratory analysis and prediction modeling, determine which attributes will be required and what data manipulation will be required. The purpose of this research is to create an accurate Churn customer prediction model and make an effective Churn reduction strategy decision. This study uses a prediction model method consisting of Random Forest, Logistic Regression, Support Vector Machine, and Ensemble. The Ensemble method showed the best results with the highest AUC (Area Under Curve) value of 0.9252. Variables that have a significant effect on Churn customers are RowNumber, CustomerId, Surname, CreditScore, Geography, Gender, Age, Tenrule, Balance, Number of Products, HasCrCard, IsActiveMember, Salary Estimation, and Exit. The results of the model were analyzed by combining the analysis of the marketing mix. The results of the analysis produce a Churn pattern for the customer reduction strategy.

**Keywords:** Customer Relationship Management, Churn customer prediction, Random Forest, Logistic Regression, Support Vector Machine, and Ensemble technique

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## Introduction

Customer Relationship Management (CRM) is a critical business technique nowadays. CRM is a tool for managing a company's interaction with its potential and existing customers. A CRM technique can be used to examine data about a customer's previous interactions with the organization (Soltani et al., 2018). Customer Relationship Management (CRM) is required by businesses to improve customer happiness, loyalty, and profitability by acquiring, establishing, and sustaining successful customer relationships and interactions with stakeholders (Baashar et al., 2020). In research conducted by Hanaysha (2021) CRM generally has a positive effect on employee-based brand equity (Hanaysha & Al-Shaikh, 2021). Due to the influence of CRM adoption on the return on investment, it is one of the fastest-growing technology solutions (Guerola-Navarro et al., 2021). Many businesses are investing heavily in data collection, integration, and analysis to carry out their operations. Customers are bombarded with numerous marketing messages every day, and many individuals disregard such messages unless they find

the value of the messages they get, for example, as part of the CRM module's marketing activities (Orenga-Roglá & Chalmeta, 2016). The more data in the CRM system, the easier it will be to develop thorough profiles using simple Big Data techniques (Talón-Ballesteros et al., 2018). CRM combined with big data has allowed firms to improve their marketing techniques, such as sending push notifications to their potential target audience via smartphones (Anshari et al., 2019). However, the larger the data, the main difficulty in predicting churn (Anshari et al., 2019). Textual data is viewed as a valuable source of information by some businesses (Raguseo, 2018). Text mining has proven to be useful in CRM (Jaiswal et al., 2019).

Customer churn prediction (CCP) is a well-known forecasting application in CRM. CCP is a technique for detecting consumers who are likely to depart a business (Ganesh et al., 2000). Because of the growing number of telecommunications providers, predicting churn in these organizations has become a crucial demand (Ahmed & Maheswari, 2017). Clients can quickly cancel their memberships and switch to another to enhance service quality and prices (Cechella et al., 2021). According to the research, annual churn in the telecommunications industry can be as high as 20-40% when the cost of getting a new client is five to ten times more than the cost of keeping the present one (Li et al., 2021). As a result, the phrase "predictive churn" is frequently used to identify customers who are canceling subscriptions or leaving other competitors' firms. Textual data is used in CCP in a limited and outdated way. because textual data necessitates stringent data pre-processing and poses substantial issues (Schneider and Gupta (2016). However, in other research, it was successful in improving the prediction performance of the CCP model by completing this tough task (De Caigny et al., 2020). Machine learning is becoming increasingly popular for predicting repurchases (Martínez et al., 2020).

In a case study that applies improvement modeling to customer retention in the financial industry, the next stage is used to evaluate and compare the performance of the customer churn prediction model and the improved model (Devriendt et al., 2021). In Saito's Research (2020), When compared to individual algorithms, the ensemble method can yield more precise glucose concentrations. This emphasizes the Ensemble method's practical utility and the need of using it to construct an accurate compartment model (Saito et al., 2020). Finally, we use the proposed weighted ensemble technique to train each basic learner and aggregate them (Tong et al., 2021).

## **Methods**

### **A. Data**

The data used in this study is a public dataset taken from the Kaggle data repository with the query "Bank Customer Churn Prediction". The dataset is about consumers in a company that is used to classify whether customers will churn or not. The data consists of 13 data attributes and 1 class label with 10,000 instances. The information varies, ranging from demographic information such as age, gender, and marital status to more professional characteristics such as RowNumber, CustomerId, Surname, CreditScore, Geography, Gender, Age, Tenure, Balance, Number of Products, HasCrCard, IsActiveMember, Salary Estimation, Exit. Examples of datasets can be seen in Table 1.

TABLE I. DATASET SAMPLES

<i>CustomerId</i>	<i>Geography</i>	<i>Gender</i>	...	<i>Exit</i>
15634602	France	Male	...	0
15647311	Spain	Male	...	1
15619304	France	Male	...	0
15701354	France	Male		0
15737888	Spain	Male		0
...	...	...	...	...
15592531	France	Male	...	0
15656148	Germany	Female	...	1
15792365	France	Female	...	0
15592389	France	Male	...	0

Based on Table I, it can be concluded that the characteristics of the data are mixed between categorical data (nominal) and numerical data. In the next step, the data will undergo a preprocessing stage to ensure the readiness of the data for further processing.

### B. Research Design

The following stages is the research design of this study.

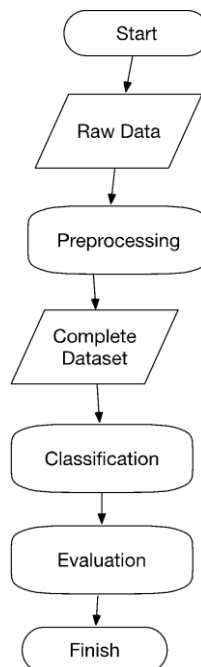


Figure 1 Research Design

### C. Preprocessing

Preprocessing is a set of processes to ensure the dataset is "clean" enough for processing. Raw datasets may contain inconsistent data, noise, incorrect data formatting, duplicate or redundant data, or missing values. therefore, such situations can reduce the effectiveness and reliability of data mining results because the data set is not conditioned to be ready for further processing. To ensure that the data is free from unwanted conditions, it is necessary to carry out a preprocessing stage. Missing values is also a problem that is handled at the preprocessing stage. As shown in Table II, there is no missing value. then we move on to the next step.

TABLE II. NOISES IN THE DATASET SAMPLES

<i>Geography</i>	<i>Gender</i>	<i>HasCrCrad</i>	<i>EstimatedSalary</i>
Germany	Female	1	119346.88
France	Female	0	74940.5
France	Male	1	71725.73
France	Male	0	80181.12
Spain	Female	1	76390.01
Germany	Male	1	26260.98

When we classify something, we normally have to deal with a lot of labels. These labels can be words, numbers, or something else. The sklearn machine learning function anticipates that they will be numbered. So, if they're already numbers, we can use them to begin training right away. However, this isn't typically the case. Labels are made in the real world in the form of words because humans can read them. We use words to designate the training data so that the mapping can be traced. The encoding label generator is used to transform word labels into numbers. The technique of converting word labels into numeric form is known as label encoding. If there are categorical variables in a regression and their values can't be factored as levels, a dummy process is used, and each value in that variable becomes another variable. The following is a list of resources(for example gender, and geography). can be seen in Figure2.

<i>tenureByAge</i>	<i>CreditScoreGivenAge</i>	<i>HasCrCard</i>	<i>IsActiveMember</i>	<i>Geography_Spain</i>	<i>Geography_France</i>	<i>Geography_Germany</i>	<i>Gender_Female</i>	<i>Gender_Male</i>
0.240000	18.440000	1	1	1	-1	-1	1	-1
0.114286	17.685714	1	1	-1	1	-1	1	-1
0.200000	17.475000	1	0	-1	1	-1	1	-1
0.048780	13.609756	1	1	-1	-1	1	-1	1
0.147059	18.764706	0	1	-1	1	-1	-1	1

Figure 2 Research Design

### D. Classification

After the data cleaning stages, also known as preparation steps, are completed. The following is the major stage of the research to be conducted, as well as the classification method employed in this study: Random Forest, Logistic Regression, Support Vector Machine, and Ensemble are some of the methods used. This approach comes pre-programmed in practically all data mining software. An ensemble classifier incorporates numerous ensemble techniques



into a process classifier in an ensemble model. In recent years, academia and industry have paid close attention to classification ensemble models, which integrate the advantages of various basic classifiers to improve predictive performance (He & Fan, 2021). Individual learners are stacked into a single strong learner using the stacking approach. The following is the general stacking principle: In k-fold cross-validation, given d various learning algorithms, assess each on the prediction matrix X, given the result vector y. The out-of-fold predictions should be saved and merged into a new data matrix Z. Z now has the same number of columns as X and the same number of rows. Then, for each column Z, calculate the weighting scheme to aggregate into the final forecast (Kurz et al., 2020).

### E. Evaluation

In each classification method, the metric for measuring how well the classification results are done is k-fold cross-validation. The evaluation method is said to be a fair and square method to measure the performance of classifiers because of the nature of the method which divides the data into several parts and conducts a training-testing process using these parts. on the first fold is treated as a validation set and the rest are fitted towards the method. Therefore, the number of parts installed in the method is k-1 fold (Coussement et al., 2017). Area Under Curve (AUC) and the top decile lift (TDL) to assess the predictive performance of different models. This CCP model often applies AUC and TDL to evaluation metrics (Coussement et al., 2017).

### Results and Discussion

As described in the previous section that the dataset undergoes several preprocessing steps such as encoding any nominal attribute into numerical and normalization for any continuous attribute. The sample of those processes can be seen in Figure 2 & Figure 3 respectively.

HasCrCard	IsActiveMember	Geography_Spain	Geography_France	Geography_Germany	Gender_Female	Gender_Male
1	1	1	-1	-1	1	-1
1	1	-1	1	-1	1	-1
1	0	-1	1	-1	1	-1
1	1	-1	-1	1	-1	1
0	1	-1	1	-1	-1	1

Figure 3. Data Encoding

Tenure	Balance	NumOfProducts	EstimatedSalary	BalanceSalaryRatio	TenureByAge
0.6	0.000000	0.333333	0.076118	0.000000	0.432000
0.4	0.360358	0.000000	0.102376	0.003317	0.205714
0.8	0.486406	0.000000	0.510225	0.000901	0.360000
0.2	0.495130	0.000000	0.555744	0.000843	0.087805
0.5	0.532094	0.000000	0.778145	0.000647	0.264706

Figure 4. Data Transformation

The dataset was then classified using several methods to provide better insight on which method performs better on this kind of problem. The classification method used in this research is X Gradient Boost, SVM, Random Forest, Log-Primal, and Stacking. The performance for each of the methods is shown by the AUC graph in Figure 5

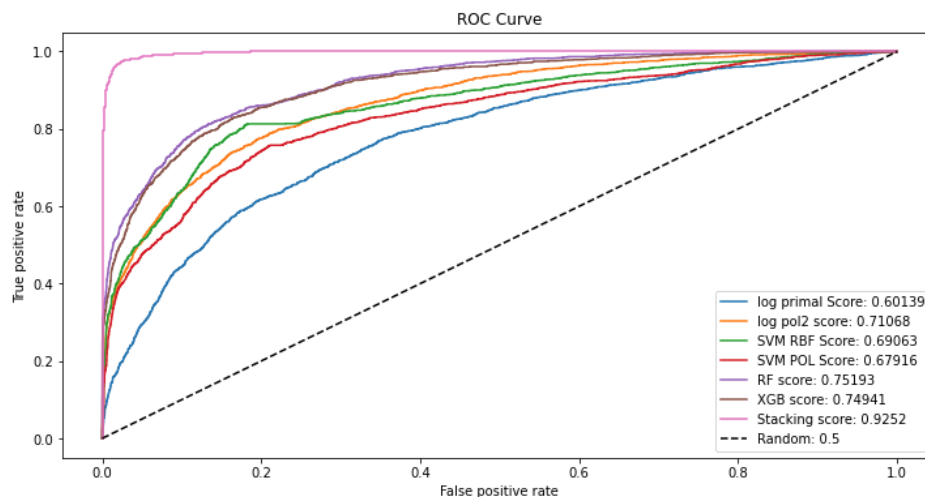


Figure 5. AUC for Classifiers

Can be seen from Figure 5 that the stacking method produces significantly better accuracy than the other classifier used in this research. It can be inferred that the stacking method can be used to predict any churners that may occur in the future using this model.

## Conclusion

This research emphasizes finding a classification method that can do a good job for the dataset. Several classification methods have been tried and yielded very different results. The best results were carried out using the Ensemble Stacking method with an accuracy score of 92%.

The future work of this research is to examine class distributions to measure potential unbalanced dataset situations and address them if any of those situations occur.

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# THE APPLICABILITY RADIATION APRON FOR MEDICAL RADIATION USE : AN OVERVIEW

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## Abstract

The use of aprons for radiation protection is regulated under the Indonesia Nuclear Regulatory Agency (BAPETEN) Decree No. 8 Year 2011 on Radiation Safety and the Use of Diagnostic and Interventional Radiological X-Ray Machines. The apron specifications prescribed are as follows: having a thickness equivalent to 0.2 mm Pb or 0.25 mm Pb for diagnostic use, and equivalent to 0.35 mm Pb or 0.5 mm Pb for interventional use. Furthermore, the National Standardization Agency (BSN) has issued SNI IEC 61331-1:2016, thereby providing guidance for testing the plate materials used in the apron, using a 400 kV x-ray machine and 1.3 MeV gamma exposure with a narrow beam, to measure the attenuation ratio and air kerma rate. This method is used to determine the attenuation ratio, build-up factors, and equivalent attenuation coefficient. In the experiment, there were 4 different aprons (A, B, C, and D) with 9 measurement points. The results showed the air kerma rate without an apron was 0.664 mGy/second, the air kerma rate with a lead-equivalent layer was 0.0006 mGy/second, and the best result was produced using apron C, with the attenuation ratio ranging from 17.2 to 29.1; this showed the most homogeneity.

**Keywords:** radiation apron, attenuation ratio, IEC 61331-1

# DOES ENERGY EFFICIENCY MATTER FOR FIRM VALUE IN INDONESIA?

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## Abstract

The attention of various groups and countries to energy efficiency has grown significantly in the last few decades. Rising energy prices and environmental concerns as well as the competitive advantages created by energy efficiency have motivated firms to adopt this strategy. However, the existing empirical research has not found a consensus between energy efficiency and firm value. Some argue the benefits of energy efficiency are unpredictable due to its complexity and non-existence of strategic planning (Sorrell et al., 2000; Fan et al., 2017). On the other hand, Indonesia as the largest energy producer and consumer in Southeast Asia are facing energy crisis. The increase in Indonesia's emissions almost tripled between 1990 and 2015, and the trend is expected to accelerate towards 2030. Firms are required to address these energy challenges in their business activities. However, empirical research related to energy efficiency and firm value is still focused on countries in Europe, America, and Asia such as China. Motivated by government regulations No. 70 of 2009 on energy conservation and No. 79 of 2014 on National Energy Policy, this study explored the associations between energy efficiency and firm value. PBV representing firm value and energy intensity representing energy efficiency were used in the analysis. Supported by stakeholders' theory, hypothesis testing was carried out using a panel data regression for a sample of 121 firms from all industrial sectors listed on the IDX for the period 2018-2020 except financial sectors. The results showed that energy efficiency was positively related to firm value, the lower the energy intensity, the higher energy efficiency produced, and the higher firm's value. From a market perspective, integrating sustainability aspects such as energy strategy could propel investors to invest. Energy efficiency investment could enhance industrial productivity and it will lead to competitive advantage creation. Our findings provide an incentive for firms to re-evaluate their sustainability strategy focusing on energy to increase firm competitiveness.

**Keywords:** energy efficiency, energy intensity, firm value, Indonesian firms

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# KNOWLEDGE IMPACT ON PROCESS INNOVATION: INTERNAL OR EXTERNAL?

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## **Abstract**

Data-driven decisions require a simplified decision-making process. Previous studies show that process innovation has proven to simplify the decision-making process in terms of speed, complexity, and accuracy. However, process innovation demands knowledge from the most reliable sources. Previous studies found that better techniques, cost reduction, and faster processes are the main objective of process innovation. This study aims to uncover how successful process innovation acquires its knowledge. As a preliminary study, seven informants from one automotive manufacturing company were included in the process. Data were gathered through semi-structured interviews. Data were then analyzed through content analysis, and the preliminary interpretation was based on the content of the discussions. This study found that internal and external knowledge are complementary, and both have a significant influence on the innovation process. External knowledge was considered more updated, more general in topics, and easier to understand. On the other hand, internal knowledge sources were considered more reliable and faster to acquire.

**Keywords:** process innovation, internal knowledge, external knowledge, decision making

# VOICE AND CHOICE FOR PROMOTING STUDENT AGENCY THROUGH THE AVID DIGITAL LEARNING FRAMEWORK

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## Abstract

When students own their learning, they are more motivated, engaged, excited, and self-directed to show mastery of their learning on a particular concept or skillset. By empowering students with choice and customized learning as well as exploring rigorous learning opportunities in an ideal learning environment, students build relationships through nurturing classroom collaboration that allows them to persist through obstacles and challenges and gain a deeper awareness of their potential. " The UDL Guidelines are a tool used in the implementation of Universal Design for Learning, a framework to improve and optimize teaching and learning for all people based on scientific insights into how humans learn"(CAST, 2018). Aligning the AVID Digital Framework- The Four A's (Adopt, Adapt, Accelerate, Advocate) with CAST Universal Design for Learning (UDL) Guidelines, educators will focus on how Engagement (the why of learning), Representation (the what of learning), & Action and Expression (the how of learning) align with AVID pedagogical approaches of the 4 A's to create meaningful learner-centered experiences and "create pathways toward meaningful integration of digital tools and WICOR Instructional practices that will increase student ownership and independence of their learning" (AVID Center, 2017). Optimizing choice and customizing learning while nurturing classroom collaboration empowers students to take ownership of their learning. AVID's Digital Framework and the Universal Design For Learning (UDL) guidelines, in combination, empower students by providing voice and choice to explore rigorous learning opportunities that allow students to exercise their academic, social, and emotional learning. This professional learning experience is designed to support educators as they connect the why, what, and how of learning in digital settings. Participants will learn how to maximize instructional decisions that best support students in the classroom to persist through obstacles and challenges, gain a deeper awareness of personal potential and build relationships to prepare them for success in the global society.

**Keywords:** Universal Design For Learning, Student Agency, Digital Framework, Learner Choice, Digital Learning Pedagogy, Instructional Practice, Ideal Learning Environment



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# WICORizing DIGITAL FEEDBACK: USING THE 4 A's TO PROMOTE EDUCATOR AND STUDENT AGENCY

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## Abstract

Whoever is doing the talking is doing the learning. This presentation discusses the importance of feedback in digital and blended learning environments between students, teachers, and peers as an instructional practice that nurtures educator and student agency. Empowered educators use their agency in instructional routines, like AVID's 4 A's® (Adopt, Adapt, Accelerate, Advocate), to support the learner. AVID's Digital Framework builds life-long learners who demonstrate student agency by expanding to and beyond content mastery as college and career-ready students. Learners are empowered to take academic risks when they are able to communicate understanding and learning successfully. Using inquiry-based feedback, collaborative learning nurtures opportunities to read and write within rigorous settings. Through feedback from the educator, to the educator, and with peers, students exercise their academic, social, emotional, and professional knowledge and skills. Educators will make connections through active learning and personal reflection to plan for these learner-centered opportunities. Presenters will evaluate how the intentional use of The 4 A's® can develop student agency, preparing students for college and career readiness. This session is designed to support educators and leaders as they evaluate feedback structures of learner to learner, teacher to learner, and learner to teacher as a way to propel WICORized (Writing, Inquiry, Collaboration, Organization, & Reading) learning opportunities. "When fully adopted, AVID has significant impacts on minimizing gaps in student achievement and college readiness, as indicated by students' subsequent college outcomes" (AVID Center, 2018).

**Keywords:** Feedback Structure, Empowered Educator, Digital Learning, Active Learning, Intentional Collaboration, Student Achievement.

## References

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# EXPLORING EFL LEARNERS' KNOWLEDGE CONSTRUCTION PROCESS IN AN ONLINE ACADEMIC DISCUSSION FORUM

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## Abstract

With the advancement of technology devices and the shift from face-to-face teaching to remote online learning in the past two years, the use of online discussion forums in academic settings has become more frequent. Using a mediated platform, online discussion forums also provide different learning experiences for students compared to face-to-face discussions. Previous research indicates that online discussion forums have a great potential in providing opportunities for students not only to interact with their peers but also to intellectually engage in their own learning processes. This study aims to explore the knowledge construction practices displayed by students in their online discussion forums via the university's Learning Management System (LMS). As this study aims to explore, the exploratory design was used. The study was conducted in a private university in Indonesia. Ten students taking the Reading course during a semester in 2020 were assigned by the course instructor to participate weekly in discussions about their academic reading texts via the university's LMS for a month. The data were taken from three discussion tasks and were analyzed qualitatively using Nicholls & Pena-Shaff's (2004) framework of knowledge construction elements. This framework provides indicators and elements of student learning in academic interaction via the discussion forum. The findings showed that the students displayed various types and frequencies of the elements of knowledge construction processes in each structure of the discussion (i.e., Opening Discussion, Building Discussion, and Closing Discussion). Overall, the students engaged in knowledge construction processes, which were mainly characterized by the elements 'Others', 'Support', and 'Clarification' as the most frequent elements that occurred in their discussion posts. On the other hand, the students displayed a low frequency of occurrence for other elements, which were 'Reflection' and 'Consensus Building'. It can be concluded that the knowledge construction elements occurred variously in different parts of the students' posts and for different purposes. The findings implied that knowledge construction is a vital role in students' learning process in an online discussion forum, and therefore, course instructors may need to foster a familiar environment that contributes to an online discussion with their students.

**Keywords:** academic discussion, EFL learners, knowledge construction, online forum

# POST-DISASTER PSYCHOSOCIAL SUPPORTS PROGRAM IN PALU, INDONESIA: PARENTS' AND MENTORS' REMARKS

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## Abstract

Following a major earthquake disaster in Palu on 28 September 2018, Wahana Visi Indonesia (WVI) and the Faculty of Psychology, Krida Wacana Christian University (UKRIDA) conducted post-disaster child psychosocial support training for mentors (Sunday school teachers and Qur'an recitation teachers). The present study presented parents' and mentors' perspectives regarding the program. We collected data using a combination of focus group discussion (FGD), to collect initial data from the mentors (1 male, 9 females) and parents (10 females), which was followed by self-report. The results revealed three broad themes, namely the importance of psychosocial support programs; the significant role of the mentors; and the roles of religious institutions in providing post-disaster psychosocial support. Participants also suggested getting broader social stakeholders involved in the future psychosocial support program.

**Keywords:** psychosocial support program, disaster, children, mentors, religious institutions

# THE COMPARISON OF DEATH ANXIETY LEVELS DURING THE COVID-19 PANDEMIC IN MEDAN

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## Abstract

The COVID-19 pandemic can easily trigger death anxiety. This study aims to find differences in the levels of death anxiety related to COVID-19 between COVID-19 Patients, COVID-19 survivors, and people who have never been infected with COVID-19. Subjects are individuals aged 18 years and over who reside in the city of Medan, North Sumatra, Indonesia. Respondents were 38 people who have never been infected with COVID-19, 38 COVID-19 survivors, and 38 COVID-19 Patients. Data was collected using the Scale of Death Anxiety and analyzed using a comparative method to compare the death anxiety mean scores of the three groups. Results showed that there were differences in the level of death anxiety related to COVID-19 experienced by COVID-19 Patients, COVID-19 Survivors, and people who had never been infected with COVID-19. The death anxiety score of the COVID-19 Patient group was significantly higher than the other two groups. Awareness about death anxiety is important, especially for COVID-19 Patients. Family, friends, health workers who treat COVID-19 patients, as well as the general community are expected to be more aware of the potential for increased death anxiety so that it can be prevented during the pandemic.

**Keywords:** *death anxiety, COVID-19, Medan*

## Introduction

COVID-19 is an infectious disease caused by a type of coronavirus that began to spread as an outbreak in Wuhan, China, in December 2019. Since March 11, 2020, the World Health Organization (2020a) has declared COVID-19 a pandemic that has occurred in many countries around the world. Most (about 80%) of infected people recover without the need for special treatment. About 1 in 5 people infected with COVID-19 suffer from severe pain and difficulty breathing. Older people and those with co-existing medical conditions such as high blood pressure, heart and lung disorders, diabetes, or cancer are more likely to develop more serious illnesses (World Health Organization, 2020b). In Indonesia, COVID-19 Confirmed Patients are grouped according to the severity of their symptoms: asymptomatic, mild symptoms, moderate symptoms, severe symptoms, and critical symptoms.

The Indonesian government has undertaken a number of initiatives to address the pandemic crisis. Vaccination is one strategy to combat the COVID-19 pandemic in Indonesia. Furthermore, according to the Decree of the Minister of Health of the Republic of Indonesia, every member of the public is required to comply with health protocols such as wearing a mask, regularly cleaning hands, and keeping a distance of at least one meter from other people, and so on. The manager, organizer, or person in charge of public spaces and facilities plays a critical role in preserving public health by implementing elements of prevention (prevent), case finding (detect), and handling quickly and effectively (respond).

In Handling COVID-19 patients, tracking of individuals who frequently interact with Confirmed Cases, quarantines, and tests are carried out. When the test results are positive, the individual is declared a Confirmed Case and must undergo isolation. In addition, based on the Instruksi Dalam Negeri No. 20 of 2021 July 9, 2021, Medan became one of the cities that must implement restrictions on community activities (PPKM Darurat) starting on July 12, 2021.

The COVID-19 epidemic has had a psychological effect on society as a whole. According to Fiorillo and Gorwood (2020), the pandemic's widespread coverage, the existing emergency's cognitive bias, and other factors contributed to public anxiety and fear. This condition causes pressure on society and can trigger death anxiety. Research conducted by Sofa, Anugrah, Nugraha, and Suherman (2021) found that 56% of respondents from Greater Jakarta had moderate to very high levels of death anxiety and 44% had low and very low levels of death anxiety.

Templer stated that the level of death anxiety for each individual can be different, one of which is caused by experiential factors that trigger it (Neimeyer, 1994). Although currently, everyone is experiencing the COVID-19 pandemic situation, each individual can have a different personal experience. According to Lehto and Stein (2009), the types of experiences that can increase death anxiety are individual experiences when in an environment that suppresses and reminds individuals of death, experiences when diagnosed with a deadly disease, or experiences when witnessing other people die. Each individual can experience one or all of these experiences so each individual's experience with COVID-19 can be different. If distinguished based on experiences related to COVID-19, the community can be divided into three groups, namely: COVID-19 patients, COVID-19 survivors, and people who have never been infected with COVID-19.

Pattee (2020) reviewed the phenomenon related to COVID-19 through the terror management theory (TMT) which stated that there are different forms of response that arise when individuals are reminded of deaths related to COVID-19. The first response is the encouragement to make oneself feel safe. This can be seen from the surge in purchases of products that are considered capable of dealing with COVID-19. Panic-buying behavior for items such as masks and hand sanitizers has emerged in the early days of the COVID-19 pandemic in Indonesia (Wahyu, Zahra, Iqbal, Firdaus, & Widyatno, 2021). However, recently there has been a surge in the purchase of dairy products, propolis, and the anti-parasitic drug Ivermectin which is considered capable of preventing and curing COVID-19 even though no research results are confirming this (Menon, 2021). The increase in COVID-19 cases in the city of Medan has also led to a surge in purchases of vitamins that are considered to increase the body's immunity (Siahaan & Prasandi, 2021).

The second response is the complete refusal to believe in the existence of COVID-19. This refusal is mainly driven by misleading information from the media, economic pressures that hindered COVID-19 prevention, lack of understanding of COVID-19 health promotion, perceptions of family and neighbors about COVID-19, and interpretation of religious teachings in the face of the pandemic (Najmah, Kusnan, Andajani, Davies, & Davies, 2021). Public distrust of COVID-19 is also considered one of the causes of the increasing number of COVID-19 cases in Medan so PPKM Darurat is necessary (CNN Indonesia, 2021). Behaviors such as denial that COVID-19 is real, ignoring health protocols, or increasing purchases of products that are considered to be able to cure or prevent COVID-19 can be an indication of death anxiety (Menzies & Menzies, 2020).

Biological conditions are important factors in death anxiety. One of the efforts that humans make to control death anxiety is to improve their physical health (Routledge & Vess,

2019). In general, advances in the field of medicine have resulted in drugs that serve to reduce the pain and discomfort associated with death (Bryant, 2003). However, ambiguity regarding treatment for the illness caused by COVID-19 could be the reason for the increasing anxiety in COVID-19 patients regarding the potential for death.

A lack of consistency in pharmacological information confuses the community (Hartiadi & Crystalia, 2020). The increasingly rare and expensive medicines amid the increase in COVID-19 cases are also making it more difficult for COVID-19 patients to recover (Pakasi, 2021). In reality, even after being proclaimed COVID-19-free, some COVID-19 survivors may develop a post-COVID condition, which is characterized by new health problems, re-infection, or persistent symptoms four weeks or more after being infected with COVID (CDC, 2021).

COVID-19 appears to generate varied responses in each community group, which may be linked to death anxiety. For example, people who have never been infected with COVID-19 stigmatize, avoid, and discriminate against those who are infected with COVID-19 (Curşeu, Coman, Panchenko, Fodor, & Raţiu, 2021). Another response that emerged was the denial of the reality regarding COVID-19 (Pattee, 2020). Whereas in COVID-19 patients, death anxiety can develop into symptoms of mental disorders such as somatic, anxiety, depression, and insomnia (Zhang et al., 2020; Dai et al., 2020; Epstein, Andrawis, Lipsky, Ziad, and Matan, 2020; Kong et al., 2020; Wang et al., 2021). Symptoms of anxiety, major depression, sleep disturbances, and PTSD also appeared in COVID-19 survivors (Canady, 2020; Mazzaa, et al., 2020).

Based on the above explanation, it can be stated that the factors that cause death anxiety and the reactions that result from COVID-19 can vary based on the individual's experience. It is hypothesized that people in Medan have different levels of death anxiety. By comparing the levels of death anxiety in the three groups (COVID-19 patients, COVID-19 survivors, and people who have never been infected with COVID-19) it may be determined to what extent COVID-19-related experiences contributed to death anxiety in Medan.

### **Literature Review**

Becker's concept of TMT stated that death anxiety is the root of human fear, and humans always control that fear daily (Kastenbaum, 2000). Firestone and Catlett (2009) described death anxiety as a complex phenomenon that represents a combination of various emotions and diverse thought processes, such as fear of death, fear of deteriorating physical and mental conditions, feelings of loneliness, anxiety about separation, sadness about the loss of one's existence, and extreme anger and despair about uncontrollable situations related to death. It can be concluded that death anxiety is an anxiety that is always present and experienced by all humans caused by the inability to accept self-immortality, giving rise to various thought processes, feelings of fear, and the urge to control this anxiety in everyday life.

Cai, Tang, Wu, and Li (2017) divided death anxiety into four dimensions: dysphoria, death intrusion, fear of death, and avoidance of death. dysphoria is described as tiredness, irritability, feelings of emotional isolation, and physiological neural reactivity at the thought of death. This aspect describes the somatic characteristics of death anxiety. Death intrusion is described as nightmares, visions of death, and disturbing thoughts about death. This aspect describes the cognitive characteristics of death anxiety. Fear of death is a feeling of fear of death with emotional symptoms. And lastly, avoidance of death is described as the avoidance of thoughts, situations, events, and experiences related to death. This aspect describes the behavioral characteristics of death anxiety.

Based on the two-factor model proposed by Templer, death anxiety is influenced by two types of factors: the individual's mental health and life experiences related to death (Neimeyer, 1994). Mental health is an intrinsic factor that reflects a person's overall psychological health condition as evidenced by measurements of anxiety and depression in general. The next factor that affects death anxiety is an extrinsic factor in the form of individual experiences related to death. These experiences can be in the form of individual experiences when in a stressful environment and remind individuals of death, experiences when diagnosed with a deadly disease, or experiences when witnessing other people die (Lehto & Stein, 2009). This could be a strong factor related to the COVID-19 pandemic that affects death anxiety in the general public.

Another variable that affects death anxiety is physical health. Based on the basic assumption of TMT that humans have an instinct to survive, humans try to maintain their physical health to live longer (Routledge & Vess, 2019). Individuals who are not physically fit or experience severe physical illness are more likely to worry about death than physically fit individuals (Viney, 1983). The emergence of physical illnesses in individuals can increase death anxiety because human mortality is more salient when one's physical health is being threatened (Saleem, Gul, & Saleem, 2015). Existing studies have also shown a strong relationship between poor physical health and increased death anxiety (Missler et al., 2012; Haroon, Khawaja, and Ghayas, 2018). COVID-19 is currently a deadly disease, so high death anxiety can be found in COVID-19 patients.

Social support can also be an important variable related to death anxiety during the pandemic, especially for COVID-19 patients. Social support is important for individuals, especially individuals with serious illnesses, to deal with the death anxiety they experience. Several studies have proven a negative relationship between social support and death anxiety (Khawar, Aslam, & Aamir, 2013; Poordad, Momeni, & Karami, 2018; Bibi & Khalid, 2019). The isolation that COVID-19 patients must undergo can reduce access to social support. Policies regarding isolation can trigger stress and increase the vulnerability of lonely people to anxiety (Brooks et al., 2020). Stress and anxiety caused by loneliness due to social isolation can harm overall physical health and weaken the body's immune system (Novotney, 2019). In addition, the social stigma that causes people to be reluctant to interact with COVID-19 patients can cause anxiety, stress, and depression in those who are stigmatized and those who try to protect those closest to them from the stigma (Sulistiadi, Rahayu, & Harmani, 2020).

Although humans can develop adaptive methods to deal with death anxiety, increased stress or threats to one's own health can lead to maladaptive consequences (Kastenbaum, 2000). An example of a form of maladaptive coping that individuals do to overcome their death anxiety is avoidance behavior (Menzies & Menzies, 2018). In the context of COVID-19, death anxiety can cause people who have never been infected with COVID-19 to avoid and discriminate against people who have been infected with COVID-19 (Curşeu, Coman, Panchenko, Fodor, & Raţiu, 2021). Pattee (2020) stated that the forms of response that appear when individuals are reminded of a death related to COVID-19 can be an encouragement to make themselves feel safe from the threat of death caused by COVID-19 and/or a denial of the existence of COVID-19.

Fears related to a death can also be the basis for developing mental disorders in individuals, especially those with serious physical illnesses. Research has found that death anxiety can be a predictor of psychopathology (Menzies, Sharpe, & Dar-Nimrod, 2019). In the case of COVID-19, studies have found the presence of somatic symptoms, depressive symptoms, and insomnia in COVID-19 patients (Zhang et al., 2020; Dai et al., 2020;



Epstein, Andrawis, Lipsky, Ziad, and Matan, 2020; Kong et al., 2020; Wang et al., 2021). Psychological disorders such as anxiety, major depression, sleep disturbances, and PTSD also appear in COVID-19 survivors (Canady, 2020; Mazzaa, et al., 2020).

## Methods

This study used a comparative quantitative research method that aimed to compare the variables studied in several categories of research subjects.

### Participant/Sample

The population for this study was people who live in the city of Medan, North Sumatra. The population was then divided into three groups, namely:

- a. COVID-19 patients: individuals who were being tested positive for COVID-19 through a PCR test.
- b. COVID-19 survivors: individuals who had tested positive for COVID-19 through a PCR test and had been declared negative based on the results of the latest PCR test.
- c. People who had never been infected with COVID-19: individuals who had never tested positive for COVID-19 through a PCR test.

This study set minimum sample size of at least 30 samples of COVID-19 patients in Medan City, 30 samples of COVID-19 survivors in Medan City, and 30 samples of people who had never been infected with COVID-19 in Medan.

This research used a nonprobability sampling method with a convenience sampling technique.

### Data Collection

The measuring instrument for this research was the Scale of Death Anxiety (SDA) which was developed by Cai, Tang, Wu, and Li (2017) to measure death anxiety and the four dimensions of death anxiety: dysphoria, death intrusion, fear of death, avoidance of death.

The level of answer preference for the scale given to respondents was 1-4: Never, Rarely, Often, and Very Often. There were five score categorizations, namely: Very Low, Low, Medium, High, and Very High.

The validity test used was content validity by professional judgment. The reliability test was carried out using an internal consistency approach, namely Cronbach's Coefficient. The tryout was carried out with 250 subjects. The reliability of the measuring instrument was considered good with a value of = 0.932. The dysphoria aspect has a value of = 0.859, the death intrusion aspect has a value of = 0.834, the fear of death aspect has a value of = 0.836, and the avoidance of death aspect has a value of = 0.551.

Item selection criteria were based on item correlation using the  $r_{ix} > 0.30$  (Azwar, 2012). The Corrected Item-Total Correlation showed that all SDA items that had been translated into Indonesian had a value  $> 0.30$  so it could be concluded that all items were usable.

### Data Analysis

In processing the data obtained, the researcher first conducted the Normality Test and Homogeneity Test. The normality test was carried out with the Kolmogorov Smirnov test to determine whether the distribution of the data to be analyzed was normal or not. In normality testing, if the significance value is greater than 0.05, it means that the data is normally distributed. The homogeneity test is carried out with the Lavene Test which aims to determine whether two or more populations (or subgroups of a population) have the same distribution of

one categorical variable. In the homogeneity test, if the significance value is greater than 0.05, it means that the data come from populations that have variance so that it can be concluded that these populations have the same distribution. To test the hypothesis, the researcher conducted a One-Way ANOVA parametric statistical test. The test criteria are taken based on the probability value (Sig.). If the probability value (Sig.) > 0.05, then  $H_0$  is accepted, and vice versa if the probability value (Sig.) < 0.05, then  $H_0$  is rejected.

### Results and Discussion

In this study, data were obtained from 114 respondents: 38 COVID-19 patients, 38 COVID-19 survivors, and 38 people who had never been infected with COVID-19. Overall, most of the respondents were women (64.9%), aged 20-29 years (57%), and Muslim (79.8%). In the COVID-19 Patients and Survivors group, most experienced mild symptoms (51.3%), and underwent COVID-19 treatment by self-isolation (72.4%).

The results of the normality test using the Kolmogorov-Smirnov test showed the significant value of the data in this study was >0.05, which means the data in this study were normally distributed. The initial results of the Levene homogeneity test showed a significance value of 0.01, which means <0.05 which did not meet the homogeneity test requirements. For this reason, the researchers tried to perform a logarithmic transformation of the data to retest its homogeneity. After the data was transformed, the significance value of the Lavene homogeneity test became 0.127, > 0.05.

In Table 1, the average score for each group of respondents shows that the COVID-19 Patient respondent group has the highest death anxiety score of 41.47 (Medium), followed by the COVID-19 Survivor respondent group with a score of 29.95 (Low), and the group of people who have never been infected with COVID-19 has the lowest score of 25.50 (Very Low).

**Table 1**

*Mean Scores of Death Anxiety*

Respondent Groups	Mean				
	Death Anxiety	Dysphoria	Death Intrusion	Fear of Death	Avoidance of Death
COVID-19 Patients	41,47 (Medium)	11,76 (Medium)	11,89 (Medium)	10,29 (Medium)	7,53 (Medium)
COVID-19 Survivors	29,95 (Low)	8,05 (Low)	8,66 (Low)	7,34 (Low)	5,89 (Low)
People who have never been infected by COVID-19	25,50 (Very Low)	6,66 (Very Low)	7,03 (Very Low)	5,76 (Very Low)	6,05 (Very Low)

Using the One-Way ANOVA test, it was found that the probability value (Sig.) = 0.000 < 0.05 so  $H_0$  in this study was rejected. Therefore, it can be concluded that there were differences in death anxiety levels and their aspects between groups of respondents.

The researcher then conducted a post-hoc Turkey test and found the probability value between the group of COVID-19 Patients and COVID-19 Survivors and COVID-19 Patients and people who had never been infected with COVID-19 was (Sig.) = 0.000 < 0.05 so that  $H_0$  was rejected. This means that there was a difference in death anxiety scores between COVID-19 patients and COVID-19 survivors where the death anxiety of COVID-19 patients was significantly higher than that of COVID-19 survivors. There was also a significant difference between COVID-19 patients and people who had never been infected with COVID-19, where the death anxiety of COVID-19 patients was significantly higher than people who had never been infected with COVID-19.

The comparison between groups of COVID-19 survivors and people who had never been infected with COVID-19 shows a probability value (Sig.) = 0.076 > 0.05 which means  $H_0$  was accepted. This shows that there was no significant difference in the average death anxiety score between COVID-19 survivors and people who had never been infected with COVID-19.

In the comparison of each aspect of death anxiety, the group of COVID-19 patients had significant differences in scores of aspects of dysphoria, death intrusion, fear of death, and avoidance of death compared to the group of COVID-19 survivors and people who had never been infected with COVID-19 with value (Sig.) < 0.05. Meanwhile, for COVID-19 survivors and people who had never been infected with COVID-19, there was no significant difference in dysphoria and avoidance of death scores with a value (Sig.) > 0.05, and there was a significant difference in death intrusion and fear of death scores with a value (Sig.) < 0.05.

The deteriorating physical condition factor experienced by COVID-19 patients was the main reason that caused this significant difference. The physical pain felt by the individual reminded them of death (Routledge & Vess, 2019). In addition, the experience of being diagnosed with COVID-19 further clarified the threat to the individual's physical condition, thereby increasing the death anxiety of COVID-19 patients.

The degree of symptoms experienced can be related to the death anxiety level of COVID-19 patients where the more severe the symptoms experienced, the higher the death anxiety level of COVID-19 patients. The results of the study also showed high death anxiety in COVID-19 patients with severe and moderate symptoms. This was further supported by the results which show a high average score of death anxiety in the respondent group of COVID-19 patients who were isolated in hospitals which were isolation places for COVID-19 patients with more severe symptoms.

Another reason that can explain why death anxiety in COVID-19 patients was higher than that in other groups of respondents might relate to the isolation that COVID-19 patients had to undergo. When infected with COVID-19, patients were asked to isolate themselves and are prohibited from direct contact with other people. This can reduce individual access to social support. The social support that a person gets is related to the death anxiety one experiences (Khawar, Aslam, & Aamir, 2013; Poordad, Momeni, & Karami, 2018). Therefore, the lack of access to social support experienced by COVID-19 patients who were being isolated was thought to cause their death anxiety levels to be higher than those of COVID-19 survivors or people who have never been infected with COVID-19. This was also supported by the results of research showing that patients who were treated in hospitals, where access to social support was more limited, show a higher category of death anxiety. However, this requires further research.

This study also found that the aspects of death intrusion and fear of death in COVID-19 survivors were significantly higher compared to the people who had never been infected with COVID-19. This could explain the emergence of symptoms of mental disorders (such as PTSD,

depression, anxiety, and sleep disorders) developed by COVID-19 survivors due to death anxiety. This assumption also requires further research.

### Conclusion

From the discussion above, it can be concluded that the death anxiety experienced by COVID-19 patients is higher than the other two groups. COVID-19 patients who are hospitalized and have moderate to high symptoms have a higher death category. Aspects of death intrusion and fear of death in COVID-19 survivors are higher than in those who have not been infected with COVID-19. This can be related to the emergence of symptoms of mental disorders in COVID-19 survivors. Factors that trigger death anxiety in COVID-19 patients include worsening physical condition, the experience of being diagnosed with COVID-19, and reduced access to social support.

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