

Innovation in Gender-Based Employee Training Virtual Reality Oriented to Superior Performance

Hasrita Lubis¹, Yusrita², Imamul Khaira³, Oris Krianto Sulaiman⁴, Khalik Pratama⁵, Evi Susilawati⁶, Alice Shanthi⁷, Ari M. Ferdian⁸, Said Harsid Harahap⁹ and Seven Tri Leumina Br. Depari¹⁰

Abstract

This research is based on the importance of analyzing the effectiveness of the Gender Virtual Reality-Based Family Planning Field Officer Training Design at the Women's Empowerment and Family Planning Office of Asahan Regency. The aim of this study is to identify the performance differences of Family Planning Field Officers who participated in the Gender Virtual Reality-based training compared to those who did not. The research method used is a quasi-experiment with a non-equivalent control group design. The subjects of the study were Family Planning Field Officers at the Population Control, Family Planning, Women's Empowerment, and Child Protection Office of Asahan Regency, totaling 55 people. The research instruments consist of measuring the level of knowledge, practical skills, and attitudes towards the work of Family Planning Field Officers using a Likert Scale. Data were collected through questionnaires, written tests, observations, and superior performance assessments. Data analysis was conducted using the Welch's t-test model. Based on the analysis results with Welch's t-Box Plot, it was found that the distribution of values in the experimental group (X1) tended to be higher compared to the control group (X2), with the average value of the experimental group (81.53) being significantly higher than the average value of the control group (78.87). The obtained p-value of 0.027 (less than 0.05) indicates a significant difference between the mean scores of the Experimental and Control Groups. Thus, the Welch test results indicate that the Gender Virtual Reality-based training for Family Planning Field Officers significantly impacts improving employee performance compared to training that is not Gender Virtual Reality-based. This research provides an important contribution to developing more effective training methods to enhance the performance of field officers in family planning.

Keywords: Effectiveness, Training, Gender, Virtual, Reality

INTRODUCTION

The Indonesia Vision 2045 based on Presidential Regulation Number 18 of 2020 proclaims the development of human resources (Peraturan Pemerintah Nomor 18 Tahun, 2020). In the development of this resource, the Asahan Regency Population Control, Family Planning, Women's Empowerment, and Child Protection Office has contributed to improving quality human resources and developing superior performance programs for all employees, including Family Planning Field Extension Employees (BKKBN, 2023; Menteri Pendayagunaan

¹ Faculty of Business Economic/Universitas Islam Sumatera Utara, Medan City, Indonesia. E-mail: hasrita@feb.uisu.ac.id, ORCID: <https://orcid.org/0000-0002-7897-2737>

² Faculty of Economic/Universitas Negeri Medan, Medan City, Indonesia, E-mail: yusrita@fe.uisu.ac.id, ORCID: <http://orcid.org/0009-0006-0588-6957>

³ Faculty of Economic/Universitas Negeri Medan, Medan City, Indonesia E-mail: imamulkhaira@unimed.ac.id, ORCID: <https://orcid.org/0000-0001-8400-2182>

⁴ Faculty of Engineering/Universitas Islam Sumatera Utara, Medan City, Indonesia, E-mail: oris.ks@ft.uisu.ac.id, ORCID: <https://orcid.org/0000-0001-6059-5710>

⁵ Faculty Education and Training/Universitas Islam Sumatera Utara, Medan City, Indonesia, E-mail: khalik29032011@gmail.co, ORCID: <https://orcid.org/0000-0001-7350-1496>

⁶ Industry Engineering Study Program, Universitas Krisnadwipayana, Bekasi, Jatiwaringin, 13077, Indonesia, E-mail: eviusilawati@fkip.uisu.ac.id, ORCID: <https://orcid.org/0000-0003-3928-498X>

⁷ Academy of Language Studies, Universiti Teknologi MARA, Cawangan Negeri Sembilan, Malaysia, E-mail: aliceshanthi@uitm.edu.my, ORCID: <https://orcid.org/0000-0002-0130-0561>

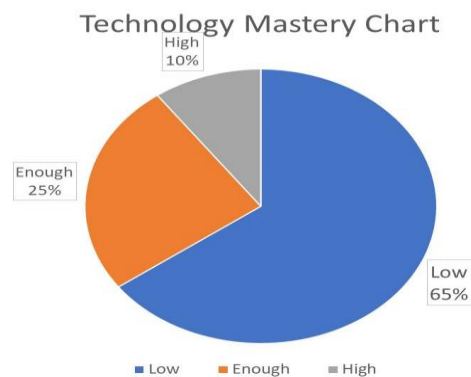
⁸ Faculty of Business Economic/Universitas Islam Sumatera Utara, Medan City, Indonesia

⁹ Faculty of Social, Humaniora, and Education/ Universitas Haji Sumatera Utara, Medan, Indonesia

¹⁰ Faculty of Economics and Business/University of Medan Area, Medan, Indonesia

Aparatur Negara dan Reformasi Birokrasi, 2018). These superior performance includes: service-oriented, accountable, competent, harmonious, loyal, adaptive, and collaborative performance (Badan Kepegawaian Nasional, 2022; Menteri Pendayagunaan Aparatur Negara dan Reformasi Birokrasi, 2021).

In carrying out the superior performance program, the employees of the Family Planning Field Extension are actually qualified in using digital technology so that they are able to serve the community professionally and responsibly (Indonesia, 2022; Azizah, 2023; Fauzia 2023). Family Planning Field Extension Employees are the spearhead of Family Planning managers in the field and are in direct contact with the community in providing counseling on the Family Planning program (Kuttiya, et al., 2023). Currently, the Asahan Regency Population Control, Family Planning, Women's Empowerment, and Child Protection Office, which supervises Family Planning Field Extension Employees in Asahan Regency, has applied digital technology in carrying out Family Planning counseling activities. Problems that arise in implementing the application of digital technology are still found by Family Planning Field Extension Employees who have not been able to apply it as seen in the following graph:



Graph 1. The Ability of Family Planning Field Extension Employees in Mastering Digital Technology

Source: Processed by Researcher (Observation of 39 Extension Workers at the Women's Empowerment and Family Planning Office in February 2024).

Referring to Graph 1, it can be seen that there are still Family Planning Field Extension Employees who lack the ability to master digital technology, which is 65%. The acquisition of this data indicates that the ability of Family Planning Field Extension Employees is still low in conducting Family Planning counseling using digital technology. Family Planning Field Extension Employees have a major role in carrying out superior performance during counseling. Currently, in carrying out superior performance, the Family Planning Field Extension Employees have used digital technology (Dwivedi et al, 2021). It is unwise if the Family Planning Field Extension Officer provides counseling only based on the general understanding or basic knowledge of Family Planning because currently the community is smart (Pongrambu, 2020). People will not just believe that the Family Planning program is important without seeing the reality in their environment that those who do not have Family Planning will have their family's welfare hampered (Nuryana et al, 2023). In conducting Family Planning counseling in this era of digital technology, Family Planning Field Extension Employees can use *virtual reality* to strengthen their family planning counseling (Inurreta-Diaz et al, 2021).

Counseling will be more interesting, sharp and imprinted in the minds of the community, if it is equipped with images or videos displayed through digital technology (BACP, 2019). With the use of *virtual reality*, the all-female Family Planning participants will be able to receive interesting material according to the reality of the lives of women (Barreda-Angeles & Hartmann, 2022; Hamad & Jia, 2022; Garduna et al, 2021). The need for Family Planning counseling materials based on digital *virtual reality* technology must be trained by Family Planning Field Extension Employees to support their superior performance in the future (Vachkovski et al, 2023; Abich et al, 2021; Wolfartberger, 2023). Family Planning counseling materials based on virtual reality

digital technology need to be trained for Family Planning Field Extension Employees to support their superior performance in the future for the following reasons: (1) Increase the effectiveness of the delivery of counseling materials where virtual reality can present information about Family Planning in a more interesting, interactive, and easy-to-understand manner. Immersive visualization and more real experience can help extension participants understand concepts better compared to conventional methods; (2) Reaching a wider audience where virtual reality technology allows counseling to be carried out virtually, so that it can reach a wider audience and spread geographically. This is very important in the context of Family Planning counseling that needs to reach people in various regions, (3) Updating skills and knowledge where with the rapid development of technology, it is important for Family Planning Field Extension Employees to continue to update their skills and knowledge. Virtual reality-based training can help them keep up with the latest developments in extension methods and related technologies; (4) Increase motivation and engagement where interactive and interesting learning experiences through virtual reality can increase the motivation and involvement of Family Planning Field Extension Officers in the training process. This can have a positive impact on the effectiveness of their training and performance in the field, (5) Preparing for the future where with the increasing integration of digital technology in various aspects of life, it is important for Family Planning Field Extension Employees to have skills in using the latest technology. Virtual reality-based training can prepare them to face future challenges and trends. Thus, training on Family Planning counseling materials based on virtual reality digital technology for Family Planning Field Extension Employees can increase the effectiveness of delivering materials, reach a wider audience, update skills and knowledge, increase motivation, and prepare them for future challenges and trends. This is very important to support their superior performance in effectively disseminating Family Planning information and services to the community.

Furthermore, research that has been conducted related to the effectiveness of the training design of Family Planning Field Extension Workers based on Gender Virtual Reality oriented to Superior Performance was researched by Gallagher, Ritter, & Satava (2020) yang mengemukakan bahwa penggunaan virtual reality dalam menilai keterampilan psikomotorik dalam prosedur bedah laparoskopi mampu memberikan wawasan tentang peran Virtual Reality dalam pelatihan keterampilan praktis. Penelitian yang dilakukan oleh Potkonjak et al, (2016) suggests that the use of virtual reality in education in the fields of science, technology, and engineering provides a perspective on how virtual reality can be used effectively in training in the health field. Checa & Bustillo (2020) conduct research on the use of virtual reality-based game games to improve learning and training. These findings can provide insights into how to incorporate gender and performance orientation aspects in virtual reality-based training design. Strategies to improve the adoption and effectiveness of virtual reality-based training were researched by Huang, Liaw, & Lai, (2016) which states that learning using immersive virtual reality by students. Then Parong & Mayer (2018) also conducted research on the cognitive and affective processes involved in science learning using immersive virtual reality. These findings can provide insights into how to design effective VR learning experiences and consider gender aspects.

The relevant research above has made a significant contribution in improving the quality of training, the performance of Family Planning Field Extension Officers, gender equality, technology adoption, and the development of quality human resources in the field of Family Planning counseling. Based on the knowledge development value based on the relevant research above, the problems faced by the Family Planning Field Extension Officer Office in Asahan Regency Asahan Regency are related to the performance of Family Planning Field Extension Employees who have not been able to utilize digital technology in conducting Family Planning counseling. Although the entire data of Family Planning participants is digital-based, Family Planning Field Extension Employees in Asahan Regency continue to conduct counseling by conducting lecture methods. The training model that has been implemented so far has not been able to maximize superior performance in the application of digital technology technology. Therefore, it is necessary to design a Superior Performance-oriented Family Planning Field Extension Training for Family Planning Field Extension Workers. The design of this training is an innovation in providing training materials to Family Planning Field Extension Workers, all of whom are women, where the design of this training uses Virtual Reality-based Family Planning counseling materials. With counseling materials in accordance with their characteristic needs through Virtual Reality simulations which contain digital simulations of women's activities of childbearing age through training

activities and no research has been conducted related to this research. Therefore, the training design of Family Planning Field Extension Workers based on Gender Virtual Reality oriented to Superior Performance has potential weaknesses that need to be considered. Therefore, the question posed in this study is: Is there a significant difference between Family Planning Field Extension employees who use superior performance-oriented Gender Virtual Reality-based training compared to employee training using superior performance-oriented Gender Virtual Reality-based training? .

RESEARCH METHOD

The research method used is a quasi-experiment. The pseudo-experimental research method is used when the researcher cannot control all the variables involved in the research. This research method is used to see a significant difference between Family Planning Field Extension employees who use superior performance-oriented Gender Virtual Reality-based training compared to employee training using superior performance-oriented Gender Virtual Reality-based training.

Research Design

This study uses Sa non-equivalent control group design. In this non-equivalent control group design, the two groups were not randomly selected with the experimental group receiving treatment or training, and the control group receiving no treatment or training. The non-equivalent control group design in the experimental group and control group in this study is seen in the following figure:

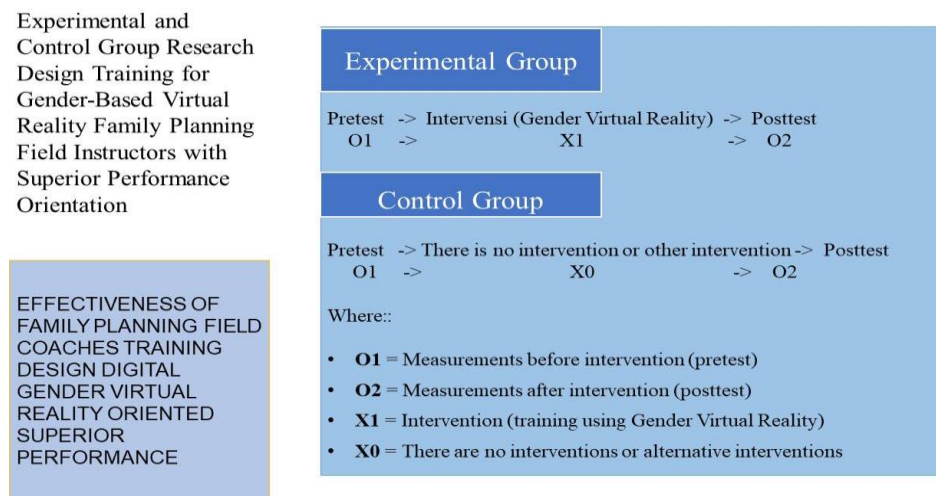


Figure 2. Experiment and Control Group for Gender-Based Employee Training Virtual Reality Oriented to Superior Performance

The procedure for non-equivalent control group design in the Figure above is described as follows: (1) Pre-test: where both groups, both experimental and control groups, are given a pre-test before the treatment is given. This pre-test aims to measure the initial ability or initial condition of both groups before treatment; (2) Provision of treatment where the experimental group was given the treatment of superior performance-oriented Gender Virtual Reality-based employee training, meanwhile, the control group was not given any treatment or continued to use the existing training program; (3) The post-test was given after the treatment was given, both groups were given the same post-test as the pre-test. This post-test aims to measure the change or difference between the experimental group and the control group after the treatment is given. The test on the non-equivalent control group design is seen in the following figure:

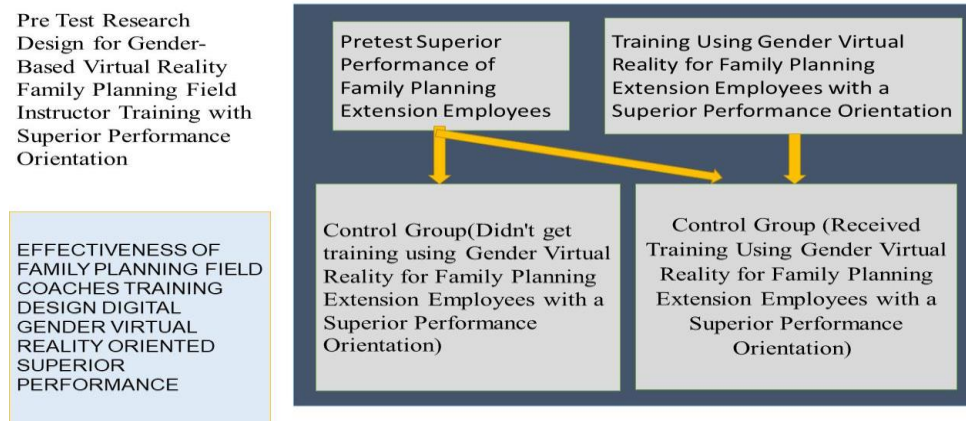


Figure 4. Pre Test Research Design for Gender-Based Employee Training Virtual Reality Oriented to Superior Performance

Furthermore, the non-equivalent control group design using the post test can be seen in the following figure:

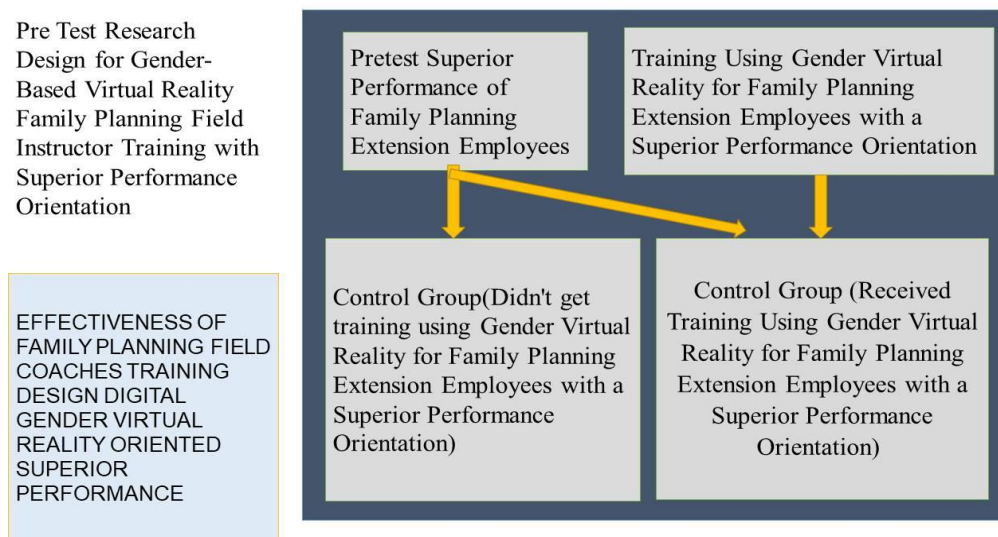


Figure 3. Post Test Research Design of Gender-Based Employee Training Virtual Reality Oriented to Superior Performance

Research Target/Subject

The subjects in this study are 55 extension employees of the Family Planning Field of the Population Control, Family Planning, Women's Empowerment, and Child Protection Office of Asahan Regency. Of this number, it is divided into two groups with the distribution of subjects: research as follows: Experimental Group: 32 people and Control Group: 23 people. The procedure for selecting research subjects is carried out based on previously established criteria. The research subjects were then divided into experimental groups and control groups based on their availability and initial conditions relevant to the study.

Instruments, and Data Collection Techniques

The research instrument of this research design consists of eight indicators based on the level of knowledge, practical skills, and attitudes towards the work of Family Planning Field Extension Workers. The measurement scale uses the Likert Scale. which aims to collect data, using questionnaires, written tests, observations, and superior performance assessments. The research instrument is seen in the following figure:

Research Instrument
 Research Design
 Training for Virtual
 Reality Gender-Based
 Family Planning Field
 Instructors with
 Superior Performance
 Orientation

EFFECTIVENESS OF
 FAMILY PLANNING FIELD
 COACHES TRAINING
 DESIGN DIGITAL
 GENDER VIRTUAL
 REALITY ORIENTED
 SUPERIOR
 PERFORMANCE

No	Indicator	Measurement Scale	Method of collecting data
1	Knowledge level	Likert Scale	Questionnaires, Written Tests
2	Practical Skills	Likert Scale	Observation, Performance Assessment
3	Attitude towards Work	Likert Scale	Kuesioner
4	Use of Gender Virtual Reality	-	Documentation, Training Notes
5	Knowledge level	Likert Scale	Questionnaires, Written Tests
6	Practical Skills	Likert Scale	Observation, Performance Assessment
7	Attitude towards Work	Likert Scale	Questionnaire
8	Performance Improvement from Pretest to Posttest	Likert Scale	Pretest and Posttest Data Analysis

Gambar 4. Instrumen Penelitian Desain Penelitian Pelatihan Pegawai Berbasis Gender Virtual Reality Berorientasi Kinerja Unggul

Data Analysis Technique

Analisis data dalam penelitian ini berbentuk **descriptive statistics yang bertujuan** menggambarkan karakteristik data secara umum dengan menggunakan mean, median, modus, standar deviasi, varian, frekuensi, dan distribusi persentase yang memberikan gambaran umum mengenai data yang dikumpulkan. Selanjutnya penelitian ini menggunakan **inferential statistics yang dilakukan melalui** uji normalitas dengan uji Shapiro-Wilk dan uji homogenitas data dengan Uji Levene. Berdasarkan hasil uji Levene menunjukkan bahwa antara kelompok kontrol dan kelompok eksperimen memiliki varians sampel yang tidak sama sehingga uji T dilanjutkan dengan **menggunakan** Welch's t-test.

RESULT AND DISCUSSION

Result

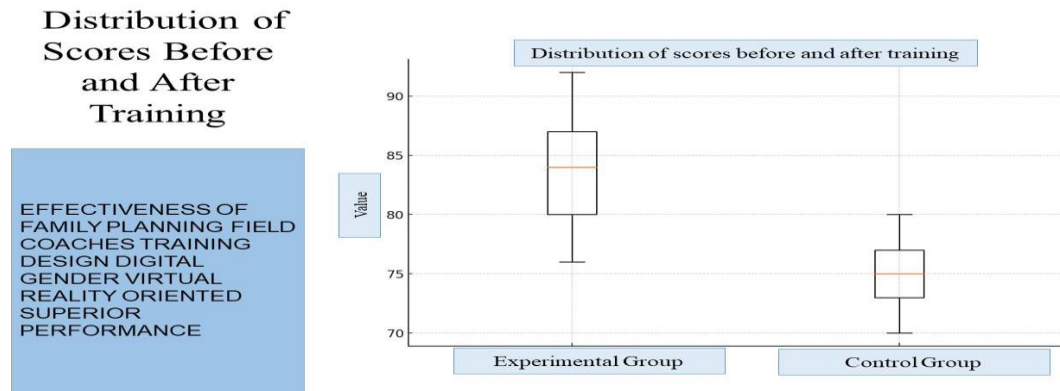
Descriptive statistics penelitian ini menyajikan data dan analisis yang terkait dengan pertanyaan penelitian yang diajukan serta pembahasan implikasi temuan bagi praktik dan pengembangan Pegawai Penyuluh Lapangan Keluarga Berencana. Secara deskriptif data awal penelitian dilihat pada Gambar berikut ini:

Group	Value Obtained
Eksperiment (X1)	70, 72, 72, 74, 74, 75, 76, 76, 77, 77, 78, 78, 79, 79, 80, 81, 82, 83, 83, 84, 84, 85, 85, 85, 86, 87, 88, 88, 89, 90, 90, 92
Control (X2)	72, 72, 73, 74, 74, 75, 75, 76, 76, 77, 77, 78, 78, 79, 79, 80, 81, 85, 85, 88, 88, 90, 90

Figure 5. Preliminary Data on Gender-Based Virtual Reality Employee Training Design Research Oriented to Superior Performance

The initial data of the above study using the experimental nature of non-equivalent control group design, there are two groups studied, namely the experimental group (X1) and the control group (X2) with experimental group data (X1): (1) total data: 32, (2) minimum value: 70, (3) maximum value: 92, (3) range: 92 - 70 = 22, (3) mean: $(70 + 72 + 72 + \dots + 90 + 90 + 92) / 32 = 80.75$. For Control Group (X2): (1) number of data: 23, (2) minimum value: 72, (3) maximum value: 90, (4) range: 90 - 72 = 18, (5) mean: $(72 + 72 + 73 + \dots + 88 + 90 +$

90) / 23 = 79.17. Based on the data above, it can be seen the distribution of the score data before the research was carried out, which can be seen in the following graph:



Graph 1. Score Distribution Before Research on Gender-Based Employee Training Virtual Reality Oriented to Superior Performance

The graph above shows the difference in values between the two experimental groups (X1) and the control group (X2) where the experimental group has a larger amount of data than the control group. To be able to make further conclusions, the study calculated the Mean, Median, Mode, Standard Deviation, Variance, Frequency, and Percentage Distribution seen in the following figure

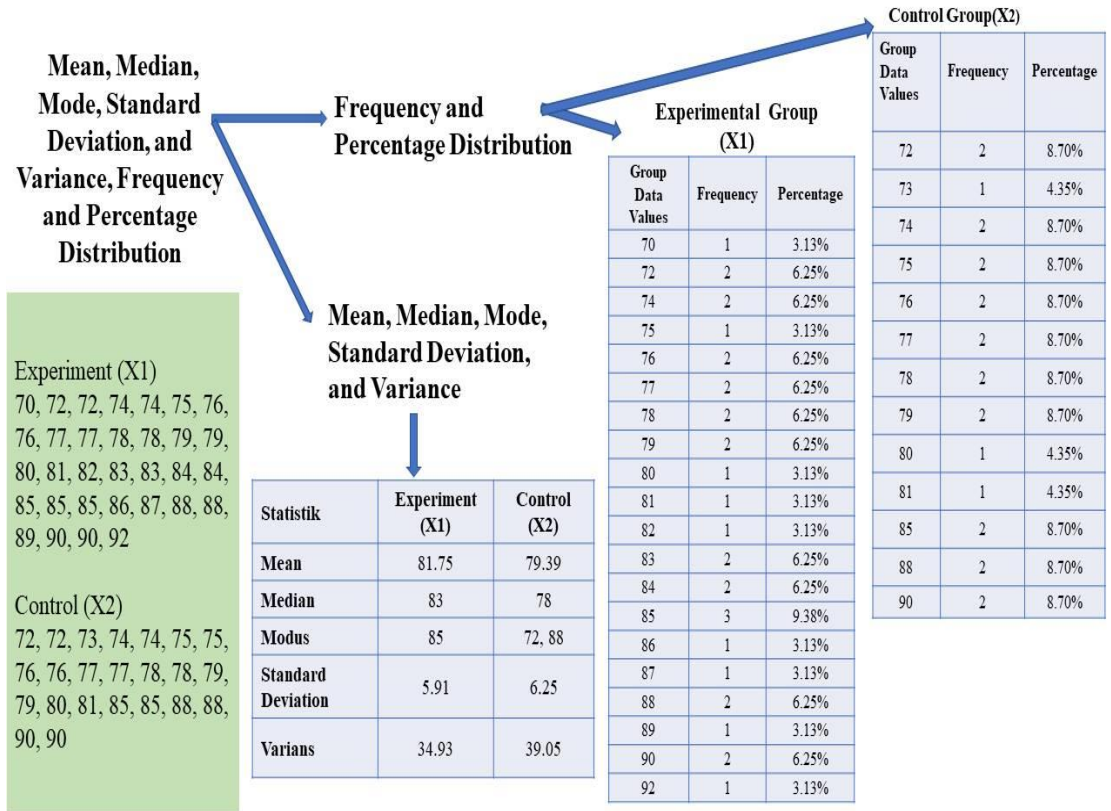


Figure 6. Calculation of Mean, Median, Mode, Standard Deviation, Variance, Frequency and Distribution of Percentage of Gender-Based Employee Training Virtual Reality Oriented to Superior Performance

The calculation of mean, median, mode, standard deviation, variance, frequency and percentage distribution of the superior performance-oriented Gender Virtual Reality-based Family Planning Field Extension Training Design in the figure above is described as follows: (a) Based on the calculation of the mean, the average of the experimental group (X1) is 81.22, while the average of the control group (X2) is 79.13; (b) Based on media calculations, the experimental group (X1) obtained is 84.5, which means the middle value of the data after sorting. While the median of the control group (X2) was 78.0; (c) Based on the calculation of the mode of data obtained. The experimental group (X1) has several modes with a frequency of 3 and the control group (X2) also has several modes with a frequency of 3, (d) the standard deviation of the experimental group (X1) is 5.74, while the standard deviation of the control group (X2) is 5.64; (e) the variance of the experimental group (X1) is 32.96, and the variance of the control group (X2) is 31.82; (f) the frequency of each value for both groups has been presented in the table; (g) The percentage distribution shows the percentage of occurrence of each value in the data group. The research data was then tested with inferential statistics using the normality test using the Shapiro-Wilk test seen in the following figure:

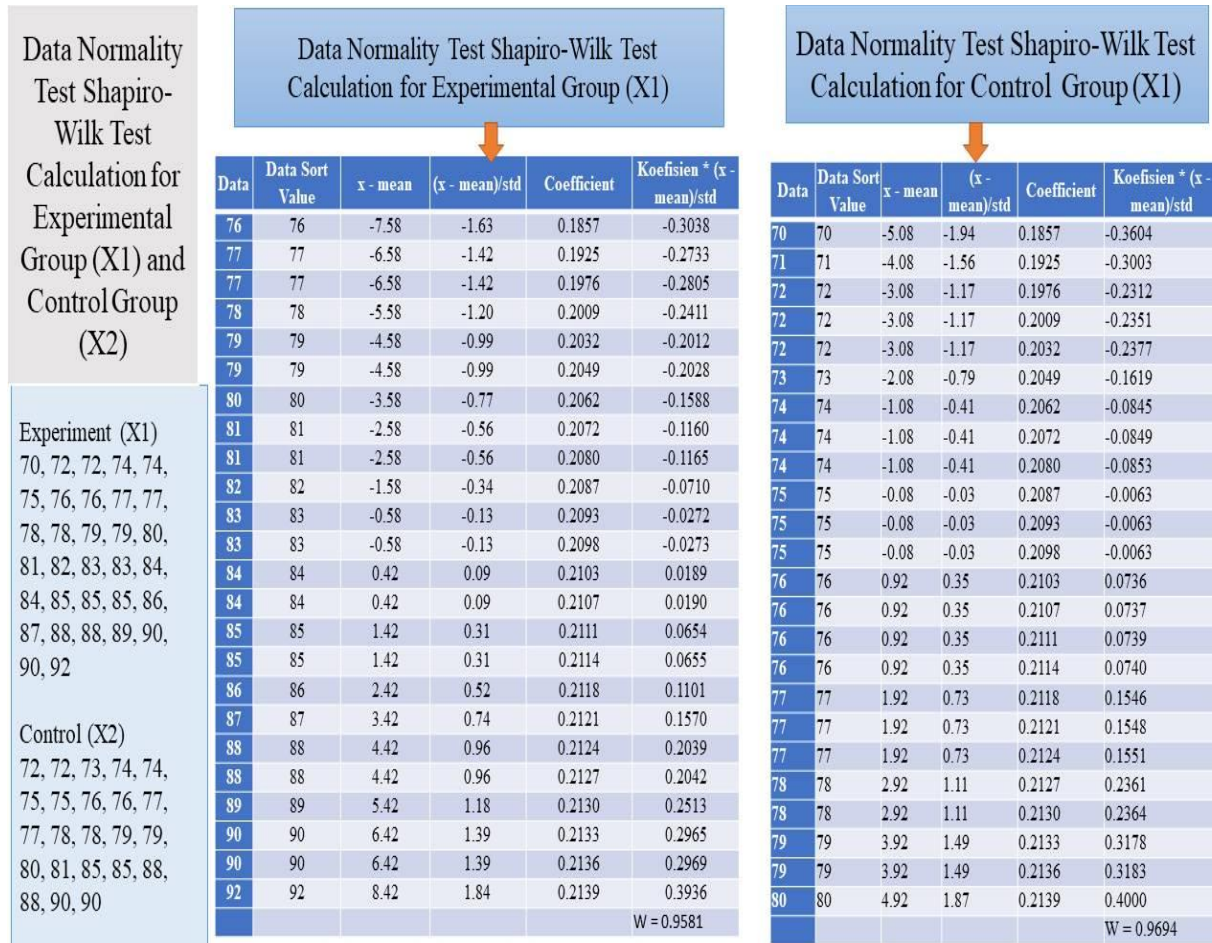
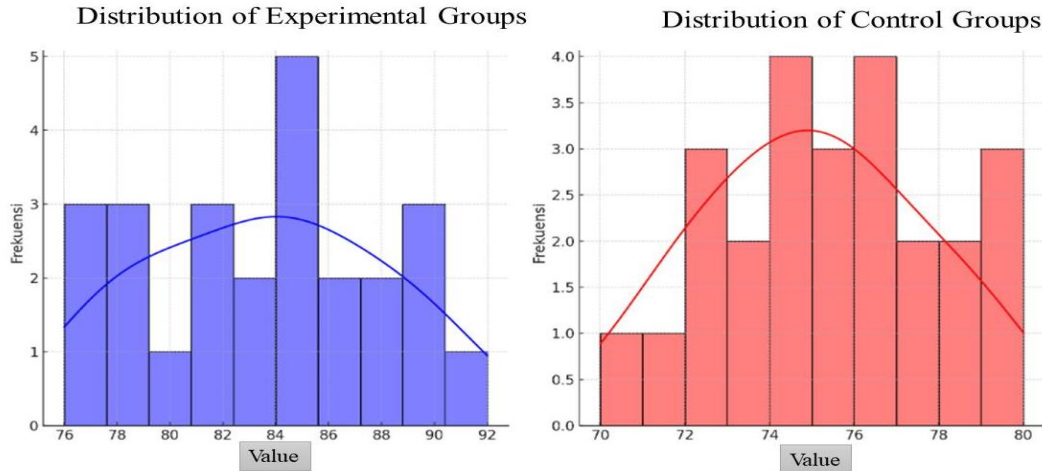


Figure 6. Calculation of the Normality Test of Gender-Based Employee Training Virtual Reality Oriented to Superior Performance

Observing the Calculation of the Normality Test in the Figure above, the following Normality Test calculations can be described: (1) the calculation of the Shapiro-Wilk test for the experimental group (X1) with mean = 83.58 and standard deviation = 4.61. The Shapiro-Wilk critical value for $n = 50$ and $\alpha = 0.05$ is 0.919. Since the value of $W = 0.9581 > 0.919$ (critical value), it rejects the null hypothesis stating that the data is normally distributed at a significance level of $\alpha = 0.05$. Then in the calculation of the Shapiro-Wilk test for the control group (X2) with mean = 75.08 and standard deviation = 2.63. The Shapiro-Wilk critical value for $n = 50$ and $\alpha = 0.05$ is 0.919. Since the value of $W = 0.9694 > 0.919$ (critical value), we cannot reject the null hypothesis stating that the data is normally distributed at a significance level of $\alpha = 0.05$. Thus, based on the Shapiro-Wilk test, the control group data (X2) can also be considered normally distributed. Since both data groups (X1 and X2) have met the assumption of normality, we can proceed with the next test to test the hypothesis related to the effectiveness of the training design of Family Planning Field Extension Employees based on Gender Virtual Reality oriented to superior performance. Thus, based on the Shapiro-Wilk test, the data of the experimental group (X1) can be considered normally distributed. The calculation of the Shapiro-Wilk test is presented in the following graph:



Graph 1. Test of Normality of Gender-Based Employee Training Virtual Reality Oriented to Superior Performance

The graph above shows the Histogram and Curve for the data of the experimental group X1) with the distribution of the experimental group data quite evenly, not too tilted to the left or right. The peak of the distribution is around a value of 84-88, which means that most of the data is centralized in that value range. For **the control group distribution (X2)** the graph shows the histogram and curve for the control group data. The data distribution of the control group was also quite even, not too skewed to the left or right. The peak of the distribution is around a value of 74-76, which means that most of the data is centralized in that value range. In general, both graphs show that the data of the experimental and control groups are distributed with fairly even patterns. However, the peak of the distribution of the experimental group was in the higher value range (84-88) compared to the control group (74-76). This kind of even distribution of data generally indicates considerable variability in the data. For further analysis, a Variance Homogeneity test was carried out using the Levene test which can be seen in the following figure:

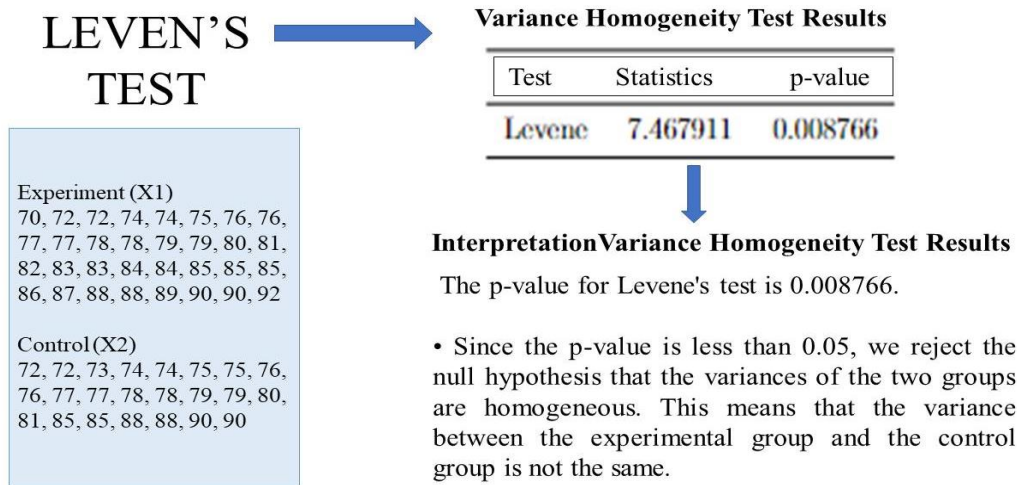


Figure 7. Levene Test for Superior Performance-Oriented Gender-Based Virtual Reality Employee Training

Based on the results of the Levene test in the figure above, it can be seen that the p-value for is 0.008766. Since the p-value is less than 0.05, we reject the null hypothesis that the variance of the two groups is homogeneous. This shows that the variance between the experimental group and the control group is not the same, meaning that the assumption of variance homogeneity in this study is not met, so this T-test uses Welch's t-test. Welch's t-test is one variant of the t-test for two independent samples used when the assumption of similarity of variance

(homogeneity of variance) between two populations is not met and the data must be normally distributed or at least close to the normal distribution. Welch's t-test calculation can be seen in the following figure:

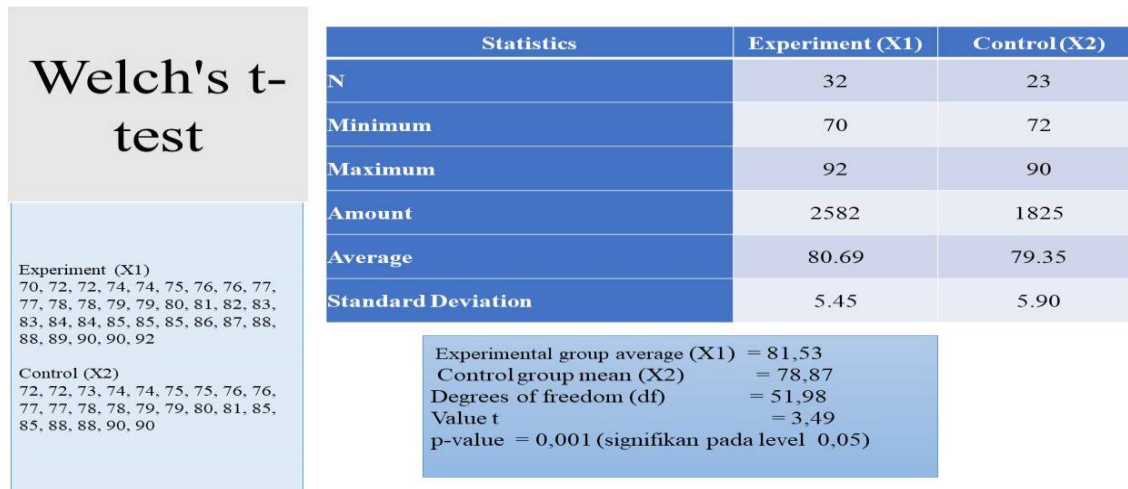
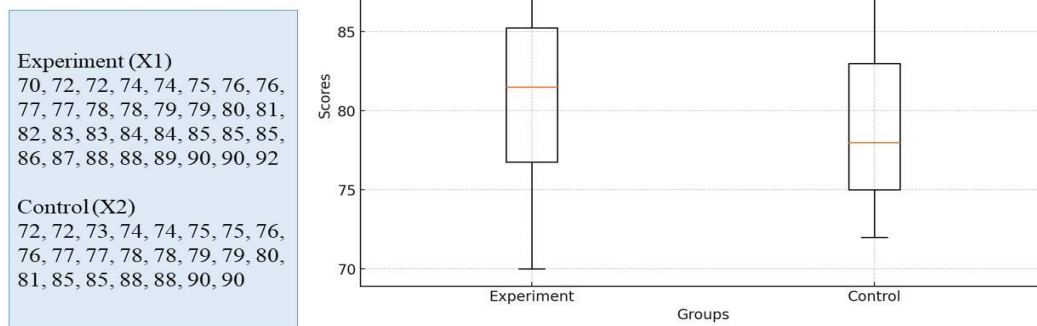


Figure 8. Results of Welch's Test for Superior Performance-Oriented Gender-Based Virtual Reality Employee Training

From the table above, it can be seen that the data data of the experimental group (X1) has a slightly higher average than the data of the control group (X2), which is 80.69 compared to 79.35. The standard deviation of the experimental group data (X1) was slightly lower than that of the control group (X2) which was 5.45 to 5.90 which showed that the experimental group data (X1) was slightly more grouped than the control group data (X2). With a p-value of 0.001 which is smaller than the significance level of 0.05, it can be concluded that the average difference between the two groups is statistically significant. A graph comparing the experimental group (X1) and the control group with the Welch t Box Plot calculation is seen below:

Comparison Graph of Experimental and Control Group Dcores using The Welch'st-Box Plot



Graph 2. Results of Welch's t-Box Gender-Based Employee Training Plot Virtual Reality Oriented to Superior Performance

The graph of Welch's t-Box Plot above shows that the value distribution of the experimental group (X1) tends to be higher compared to the value distribution of the control group (X2). This result is in accordance with Welch's t-test calculation which shows that the average score of the experimental group (81.53) is significantly

higher compared to the average score of the control group (78.87). Based on the results of the calculation of Welch's t-Box Plot with a p-value of 0.001, which is smaller than the significance level of 0.05, it can be concluded that there is a significant difference between Family Planning Field Extension employees who use superior performance-oriented Gender Virtual Reality-based training compared to superior performance-oriented non-Gender Virtual Reality-based employee training.

DUSCUSSION

Training is one of the important factors to improve the competence and performance of Berencan Family Field Extension Officers at the Asahan Regency Women's Empowerment and Family Planning Office. The implementation of training for Family Planning Field Extension employees using Gender Virtual Reality has proven to be effective in improving superior employee performance. The application of Gender Virtual Reality has made it possible to simulate employee training in real situations so that it can improve the understanding and skills of trainees. The findings of this study are in line with the results of a study conducted by Makransky et al. (2019) which found that Virtual Reality training that describes gender discrimination situations in the workplace can significantly increase participants' empathy and awareness of the problem compared to traditional methods. The findings of this study also support the research of Ventura et al. (2021) which stated that the use of Virtual Reality has helped trainees in understanding the challenges faced by women in the fields of science, technology, engineering, and mathematics. Furthermore, this study supports research conducted by Yee et al. (2020) which states that the use of Virtual Reality is beneficial for practicing negotiation and leadership skills in a gender context. Participants who took part in the training using Virtual Reality had shown a significant increase in confidence and ability to handle gender-biased situations. The findings of this study also support the results of research conducted by Shuler et al. (2022) which stated that the use of Virtual Reality has trained communication and problem-solving skills in situations involving sexual harassment in the workplace. The results showed that participants who took part in VR training were more prepared and confident in handling the situation compared to the control group. The findings of this study support the results of research by Wang et al. (2023) who have developed Virtual Reality simulations to train understanding gender diversity and gender identity. Participants who took part in the Virtual Reality training showed significant improvements in knowledge and more positive attitudes towards gender diversity. The findings of the above study show that employees who take part in Gender Virtual Reality-based training experience a significant increase in understanding in a more real and in-depth manner than just reading or listening to theoretical explanations. In addition, Gender Virtual Reality-based training has great potential to improve the competence and performance of Family Planning Field Extension employees in providing better and gender-responsive family planning services. Gender Virtual Reality technology offers an innovative and effective training approach in preparing PLKB to face challenges in the field. The findings of this study have the following implications: (1) Increasing the effectiveness of training where Gender Virtual **Reality-based training** allows family planning field extension workers to get practical and realistic experience without having to be physically in the field. This increases the effectiveness of training because extension workers can practice in a safe and controlled environment, as well as get direct feedback; (2) Improvement of **accessibility and inclusivity**. The use of Gender Virtual Reality in training can reduce geographical and physical constraints, allowing extension workers in remote areas or with limited mobility to still receive high-quality training. In addition, gender-based training can ensure that the specific needs and challenges faced by women and men extension workers are well addressed and accommodated; (3) **Development of specific skills of employees**. With Gender Virtual Reality, employee training can be tailored to develop specific skills needed by family planning field extension workers. For example, extension workers can be trained to handle certain situations, such as counseling couples regarding contraception, in a virtual environment that simulates a real situation; (4) **Reduction in training costs and time**. Gender Virtual Reality can reduce the costs associated with conventional training, such as travel and accommodation costs for on-site training. In addition, the time spent on training can also be reduced because Gender Virtual Reality training can be done anytime and anywhere according to the availability of participants' time; (5) **Better evaluation and monitoring**. Gender Virtual Reality technology allows trainers to monitor and evaluate extension worker performance more effectively. The data and metrics generated from VR training sessions can be used to evaluate employee strengths and weaknesses, as well as to tailor more personalized training programs; (6) Increasing **readiness in the field**. Gender Virtual Reality-based training can increase

the readiness of extension workers to face various situations in the field with more confidence. Realistic simulations allow them to practice the necessary skills and feel better prepared to handle challenges in the real world; (6) **Increase in employee satisfaction and motivation.** Innovations in training methods, such as the use of Gender Virtual Reality, can increase employee satisfaction and motivation. Engaging and interactive training tends to be preferred and can increase employees' active participation and commitment to the training program; (7) **Influence on training policies and strategies.** The results of this study can influence future training policies and strategies. Governments and related organizations may consider integrating Gender Virtual Reality technology in their training programs as a way to improve the quality and effectiveness of training family planning field extension workers; (8) **Gender empowerment where** by focusing on gender-based training, this Gender Virtual Reality-based training program can help reduce the gender gap in terms of access to training and skills development. This can have a positive impact on women's empowerment in the role of family planning field counselors. The implications of the above research show that this Gender Virtual Reality-based training innovation not only improves the performance and competence of Family Planning Field Extension Workers, but also has a positive impact on the effectiveness of the overall family planning program.

ACKNOWLEDGMENTS

On this occasion, we, the writing team, would like to thank you for funding this research. This work is supported by a grant from the Directorate of Research and Community Service of the Ministry of Education and Culture which has provided grant assistance in 2024. Thank you also for the moral support provided by the Rector, Chairman of the Research Institute, Dean of the Faculty of Economics and Business, Islamic University of North Sumatra, along with a research team from the University of Medan Area, Haji University of North Sumatra as all students who participated in collaborating in this research which has become the main driver in each stage of this research. The trust given to us to develop and apply innovative technology in the training of Family Planning Field Extension employees is very valuable in developing the treasure of knowledge in applying Gender Virtual Reality technology as an effective and innovative training tool. Thank you very much for all the contributions that have been made by the leadership. We hope that the results of this study can provide significant and sustainable benefits for family planning programs and can be a foundation for further development in the future.

REFERENCES

- Azizah, F. A. (2023). Melalui ASN Culture Fest 2023, BKKBN Pacu Kinerja Pegawai dengan Internalisasi Nilai Berakhlak. <https://www.bkkbn.go.id/berita-melalui-asn-culture-fest-2023-bkkbn-pacu-kinerja-pegawai-dengan-internalisasi-nilai-berakhlak>
- Abich, J., Parker, J., Murphy, J. S., & Eudy, M. (2021). A Review Of The Evidence For Training Effectiveness With Virtual Reality Technology. *Virtual Reality*, 25, 919-933. <https://doi.org/10.1007/s10055-020-00498-8>
- Checa, D., & Bustillo, A. (2020). A review of immersive virtual reality serious games to enhance learning and training. *Multimedia Tools and Applications*, 79(9), 5501-5527. <https://doi.org/10.1007/s11042-019-08348-9>
- Badan Kependudukan dan Keluarga Berencana Nasional. (2023). Peraturan Nomor 4 Tahun 2023 Tentang Petunjuk Teknis Proyek Prioritas Nasional Penguatan Pelayanan Ramah Lansia Melalui Tujuh Dimensi Lansia Tangguh Dan Pendampingan Perawatan Jangka Panjang Bagi Lansia Di Kelompok Kegiatan Bina Keluarga Lansia. <https://peraturan.go.id/id/peraturan-bkkbn-no-4-tahun-2023>.
- Badan Kepegawaian Negara. (2022). Surat Edaran Kepala BKN Nomor 14 Tahun 2022 Tentang Nilai-Nilai Core Values Asn Berakhlak Dan Perwujudan Perilaku Insan BKN Di Lingkungan Badan Kepegawaian Negara. <https://www.bkn.go.id/regulasi/surat-edaran-kepala-bkn-nomor-14-tahun-2022/>.
- Barreda-Angeles, M., & Hartmann, T. (2022). Psychological benefits of using social virtual reality platforms during the covid-19 pandemic: The role of social and spatial presence. *Computers in Human Behavior*, 127, 107047. <https://doi.org/10.1016/j.chb.2021.107047>
- BACP. British Association for Counselling and Psychotherapy. (2019). Using Digital Technology in the Counselling Professions. BACP House. <http://www.bacp.co.uk/media/6308/bacp-using-digital-technology-in-counselling-professions-research-overview-gpia107-july2019.pdf>
- Dinas P2KBP3A Kabupaten Asahan. (2021). Dinas P2KBP3A Kab. Asahan Sosialisasi dan Orientasi Kader KB Pendataan Keluarga Tahun 2021. <https://dppkbpppa.asahankab.go.id/detailpost/dinas-p2kbp3a-kab-asahan-sosialisasi-dan-orientasi-kader-kb-pendataan-keluarga-tahun-2021>.
- Dwivedi, Y. K., Ismagilova, E., Hughes, D. L., Carlson, J., Filieri, R., Jacobson, J., Jain, V., Karjaluo, H., Kefi, H., Krishen, A. S., Kumar, V., Rahman, M. M., Raman, R., Rauschnabel, P. A., Rowley, J., Salo, J., Tran, G. A., & Wang, Y. (2021). Setting

- The Future of Digital and Social Media Marketing Research: Perspectives and Research Propositions. *International Journal of Information Management*, 59, 102168. <https://doi.org/10.1016/j.ijinfomgt.2020.102168>
- Fauzia, R. (2023). Pegawai BKKBN Dituntut Adaptif Teknologi untuk Menuju Birokrasi Digital. Badan Kependudukan dan Keluarga Berencana Nasional (BKKBN). <https://www.bkkbn.go.id/berita-pegawai-bkkbn-dituntut-adaptif-teknologi-untuk-menuju-birokrasi-digital>
- Gallagher, A. G., Ritter, E. M., & Satava, R. M. (2020). Virtual reality as a metric for the assessment of laparoscopic psychomotor skills: Learning curves and reliability measures. *Surgical Endoscopy*, 17(12), 1746-1752. <https://games.jmir.org/2020/4/e19723/>
- Garduno, H. A. S., Martinez, M. I. E., & Castro, M. P. (2021). Impact of Virtual Reality on Student Motivation in a High School Science Course. *Applied Sciences*, 11(20), 9516. <https://doi.org/10.3390/app11209516>
- Inurreta-Diaz, M., Morales-Gual, Y., Aguilar-Vargas, E., Alvarez-Baeza, A., Magrina-Lizama, J. S., Cetina-Sauri, G., Fernandez-Segura, M. A., & Gongora-Biachi, R. A. (2021). Family-Planning Counselling Simulation For Medical Students: An Exploratory Educational Intervention. *Educacion Medica*, 22(4), 271-276. <https://doi.org/10.1016/j.edumed.2020.01.002>
- Hamad, A., & Jia, B. (2022). How Virtual Reality Technology Has Changed Our Lives: An Overview of the Current and Potential Applications and Limitations. *International Journal of Environmental Research and Public Health*, 19(18), 11278. <https://doi.org/10.3390/ijerph191811278>
- Huang, H. M., Liaw, S. S., & Lai, C. M. (2016). Exploring learner acceptance of the immersive virtual reality learning environment: An attitude-behaviour consistency study. *Behaviour & Information Technology*, 35(4). <https://www.irrod.org/index.php/irrod/article/view/2503>
- Kuttiya, Andarwulan, S., & Latifah, A. (2023). Peran Penyuluh KB dalam Peningkatan Partisipasi Kb Pasca Salin di Puskesmas Tonggoh. *Seminar Nasional Hasil Riset dan Pengabdian*, 6. <https://snhrp.unipasby.ac.id/prosiding/index.php/snhrp/article/view/876>
- Makransky, G., Petersen, G. B., & Konen, K. (2019). Virtual reality in education: A mixed methods study on students' engagement and learning. *Social Psychology of Education*, 22(5), 1115-1138. <https://osf.io/preprints/psyarxiv>
- Menteri Pendayagunaan Aparatur Negara dan Reformasi Birokrasi. (2018). Peraturan Nomor 21 Tahun 2018 Tentang Jabatan Fungsional Penyuluh Keluarga Berencana. <https://peraturan.bpk.go.id/Details/132527/permen-pan-rb-no-21-tahun-2018>
- Menteri Pendayagunaan Aparatur Negara dan Reformasi Birokrasi. (2021). Surat Edaran Nomor 20 Tahun 2021 Tentang Implementasi Core Values dan Employer Branding Aparatur Sipil Negara. <https://jdih.maritim.go.id/id/se-menpanrb-no-20-tahun-2021>
- Menteri Pendayagunaan Aparatur Negara dan Reformasi Birokrasi. (2022). Peraturan Nomor 52 Tahun 2022 Tentang Jabatan Fungsional Penyuluh Keluarga Berencana. <https://peraturan.bpk.go.id/Details/240810/permen-pan-rb-no-52-tahun-2022>
- Nuryana, D., Cahyani, R. A., Rahayu, S., Romadlona, N. A., & Liyanto, E. (2023). Unmet Need for Family Planning in Indonesia and Its Associated Factors. *Makara Journal of Health Research*, 27(1), 25-35. <http://dx.doi.org/10.7454/msk.v27i1.1403>
- Parong, J., & Mayer, R. E. (2018). Cognitive and affective processes for learning science in immersive virtual reality. *Journal of Computer Assisted Learning*, 34(5), 606-618
- Peraturan Pemerintah Nomor 18 Tahun 2020 Tentang Rencana Pembangunan Jangka Menengah Nasional Tahun 2020-2024. <https://peraturan.bpk.go.id/Details/134567/pp-no-18-tahun-2020>
- Pongrambu, M., Afrilda, Y., Niko, G. F., & Nurdin, A. (2020). Panduan Mekanisme Operasional Lini Lapangan Program Bangsa Kencana. BKKBN. <https://monalisa.bkkbn.go.id/downloadinfo/14>
- Potkonjak, V., Gardner, M., Callaghan, V., Mattila, P., Guetl, C., Petrović, V. M., & Jovanović, K. (2016). Virtual laboratories for education in science, technology, and engineering: A review. *Computers & Education*, 95, 309-327. <https://graz.elsevierpure.com/en/publications/virtual-laboratories-for-education-in-science-technology>
- Shuler, H., Kourianova, A., & Xu, X. (2022). Virtual Reality Training for Workplace Sexual Harassment Prevention: A Pilot Study. *Journal of Diversity and Gender Studies*, 8(2), 119-136. <https://betterwork.org/reports-and-publications/>
- Ventura, S., Majchrzak, A., & Guibault, M. (2021). Using Virtual Reality to Increase Awareness and Understanding of Gender Bias in STEM. *Information Systems Research*, 32(2), 481-498. <https://www.mdpi.com/2071-1050/13/22/12730>
- Vuchkovski, D., Zalaznik, M., Mitrega, M., & Pfajfar, G. (2023). A Look at The Future of Work: The Digital Transformation of Teams from Conventional to Virtual. *Journal of Business Research*, 163, 113912. <https://doi.org/10.1016/j.jbusres.2023.113912>
- Wang, Y., Li, B., & Liang, R. (2023). Promoting Gender Diversity Understanding through Virtual Reality: An Exploratory Study. *Computers in Human Behavior*, 130, 107146.
- Wolfartsberger, J., Zimmermann, R., Obermeier, G., & Nedermayr, D. (2023). Analyzing the Potential of Virtual Reality-Supported Training for Industrial Assembly Tasks. *Computers in Industry*, 147, 103838. <https://doi.org/10.1016/j.compind.2022.103838>
- Yee, N., Bailenson, J. N., & Carstensen, L. L. (2020). Embodied experiences in immersive virtual environments: Effects on low- and high-level cognitive and affective processes. *Human-Computer Interaction*, 35(5), 379-412. <https://stacks.stanford.edu/>