

ANALYSIS SUMMARY



MINDBENDERS

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Bending minds to follow their own learning path;
Incorporating Augmented Reality and Virtual Reality into
Teaching and Learning Practices





MindBenders, Inc., brings their strengths and talents together
for the purpose of changing the world of education.

These combined efforts create an exciting and challenging world in education
where students can follow their own paths to learning through instructional design.

MindBenders, Inc., serves clients in the Athens, GA, area, the continental United States,
and around the globe.

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TEAM PROFILE



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▪ **Background**

The North-West University (NWU) is based in South Africa and consists of three campuses. The Centre for Teaching and Learning (CTL) provides equal access to quality teaching and learning and student success to each campus. According to the 2019 Educause Horizon Report, one of the developments in education technology for Higher Education that can be implemented in a year or less is mobile learning, specifically using augmented reality, virtual reality, or a combination of the two. As part of the NWU teaching and learning strategy, NWU provides, "Opportunities for staff to enhance their capacity to design relevant learning material that provides an interactive learning experience, and directs students to a range of accessible resources that supports their individual learning needs."

▪ **Need for the Instructional Design**

Currently, mobile learning or reality training is not available through CTL and design projects are created only by CTL media and graphic designers. With limited human capital, the current performance interruption is the result of having too few designers for adequate support. NWU has requested that MindBenders, Inc., provide training to staff, faculty, and students in mobile learning using realities in order to broaden their learning capacities.

The purpose of this analysis summary is to provide detailed information about the scope of the instructional design requested, the current and prerequisite skills for obtaining the instruction as determined by the design team, and the skill level that the current learners possesses.

▪ Learning Organization

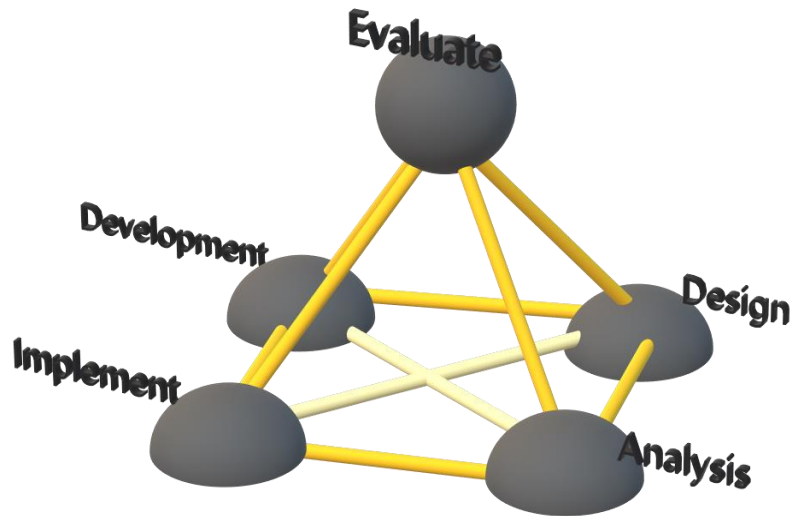
The training program will also be offered to instructors and students of NWU. The training will be presented as part of the professional development opportunities provided by CTL. Completion of this training will contribute to professional development portfolios and enable facilitators to participate in NWU rewards/awards. Trainees ages will range from 20 to 65 and computer skills levels will vary.

When the training has been completed, the learner will possess the knowledge of reality options available for teaching and learning and content development using augmented or virtual reality. Training will include information regarding the organization of NWU instruction, instructional practices, technology, and the contact person responsible for scheduling instructional design.

The NWU uses SAKAI as a Learning Management System for most training, whether online or traditional teaching. Current training includes three hour in-class sessions, all day in-class sessions, online courses, and blended courses. Blended courses consist of three hours of in-class instruction with an online component.

Two NWU educational technologists will serve as facilitators for the training sessions and will repeat the training at each campus. All three campuses are equipped with a learning venue with mobile tables and chairs, computers, internet access, a projector, a whiteboard, and a minimum of three Android tablets or iPads. Facilitators will have access to the LMS, Articulate 360, and Adobe Creative Cloud. Students have access to all Google Suite tools.

Using the ADDIE process as a guide, MindBenders, Inc. present instructional programs to assist teachers and students in new and exciting learning series and episodes. These series and episodes make the most of the tried and new ideas using the tools of technology available to each one.



Our instructional design starts from the analysis stage, but in order to be flexible enough to adjust to the real-time situation, each phase can be edited and iterated if needed. Evaluate phase permeates all the stages, and it has a core, crucial role to inspect if each of the ID processes is conducted adequately.

PERFORMANCE ASSESSMENT

Actual Performance	Desired Performance	Primary Cause	% of Total Discrepancy
90% did not know how to determine if AR/VR would enhance the learning experience.	Adequately determine how to use of AR or VR to enhance the student learning experience.	<ul style="list-style-type: none"> Learners have the misconception that the use of technology always enhances the learning experience without consideration of pedagogy and appropriate content. 	20%
10% of the target audience thought that using a QR code means you are using AR or VR	Understand what a QR-code is and the role it plays within an AR or VR experience.	<ul style="list-style-type: none"> Learners do not know the meaning of AR, VR, or QR codes, making assumptions that the technology is the same. They should understand that even though QR codes play a role in the AR and VR experience, simply using a QR code does not automatically mean you are implementing AR or VR. 	31%
89% answered that they have no clue on how to integrate technology with the right pedagogical model.	Design a lecture, module, or course that maximizes the learning experience by applying the AR and VR tools.	<ul style="list-style-type: none"> Learners held a misconception, believing that merely introducing the technology will enrich the learning experience. This is circumstantial. Learners who already knew the concept of AR and VR were not yet acquainted with the concept of technology-integrated teaching models. 	19%
After watching a video regarding the use of AR and VR, 10% could not	Distinguish the features of AR and VR name it correctly.	<ul style="list-style-type: none"> Learners were confusing the concept of AR and VR. Some of them even 	20%

<p>identify the name of the technology.</p>	<p>assumed these terms referred to the same function.</p> <ul style="list-style-type: none"> ▪ Students are not familiar with AR and VR technology.
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<p>65% could not explain the basic operating mechanism of AR and VR.</p>	<p>Identify how AR and VR technology works and compare the difference.</p>	<ul style="list-style-type: none"> ▪ Learners lack prior knowledge of AR and VR technology. ▪ They resisted learning about the new educational tools and software because they had low self-efficacy in learning new technology. 	<p>26%</p>
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Total = 100%

Purpose Statement

The purpose of the training is to provide participants with information and equip them with the skills and knowledge to apply the TPACK model to the implementation of AR/VR in their teaching & learning practices.



INSTRUCTIONAL GOALS

Knowledge

- Identify how to use the Virtual Reality and Augmented Reality software.
- Identify the concepts and key perspectives of TPACK and PICRAT.

Comprehension

- Describe the necessity of a technology-integrated learning environment and discuss its application in learning spaces.
- Compare AR and VR tools and software that may be used in the education context (i.e., Augmented Class!, HP Reveal, Metaverse, Vizard)

Application

- Adapt an existing AR/VR example to create a lesson suited to the area of expertise

Analysis

- Analyze the components of the technology-integrated learning designs created by the learners.

Synthesis

- Design and develop a lesson plan using the TPACK model to implement a suitable AR or VR experience.
- Generate an example of a VR or AR experience for the lesson plan created.

Evaluation

- Conduct self/peer evaluations of AR and VR lesson plans.

Learner Group

Training will be directed toward two learner groups;

▪ **Primary target group (Group 1):**

Academic staff with lecturing responsibilities at the North-West University who should attend Professional Development opportunities offered by the Centre for Teaching and Learning.

▪ **Secondary target group (Group 2):**

Education major students studying to become teachers.

The training should be developed for a broad base of education practitioners, not limited to higher education or K-12 instructors.

Characteristics

▪ **Group 1:**

When considering the average characteristics of academic staff at the NWU the following characteristics deductions can be made:

- Average age of staff is 38.
- More than 52% of staff are caucasian, with 36% African and 13% either Indian, Coloured, Asian or other foreign nationals.
- About 55% of staff are female.
- Proficiency in English is a prerequisite for employment and the primary language of instruction, so even though English might not be their mother tongue, all are proficient with reading, writing and speaking English.

▪ **Group 2:**

The average age of members in this group is 21 years old, the majority are female students with a minimum of a High School certificate. A prerequisite for studying education is pass score for English, so all members of this group are proficient with English even if it isn't their mother tongue. The groups will differ according to location. Two of the three locations will have the majority of African students, while the third location will be predominantly caucasian.

Numbers

▪ **Group 1:**

An average of 500 Academic staff members attends CTL training opportunities per semester, spread across the three locations. According to data from 2018 and 2019 the average training session is expected to have between 15-20 attendees per location.

▪ **Group 2:** There are about 6000 undergraduate students across the three campuses. An average training session is expected to have between 15-40 attendees per location.

Location

▪ Training will need to take place in three locations (Mahikeng, Potchefstroom, and Vanderbijlpark). Distance between campuses is about 100km (about 62 miles) from Vanderbijlpark to Potchefstroom and another 209km (about 130 miles) from Potchefstroom to Mafikeng.

▪ Training will be in-class or by NWU Learning Managements System (Sakai powered) called eFundi. A Zoom video conferencing license is already available to use for training purposes.

▪ Since the training will be for staff and students based on different campuses, there will be no need for travel or accommodation arrangements for students.

▪ Facilitators may be required to travel, especially for the train-the-trainer event.

Experience

▪ **Group 1:**

About 25% have 0-11 months teaching experience, 25% have 1-3 years of teaching experience, 30% have 4-10 years of teaching experience, while 20% have 11+ years of teaching experience.

▪ **Group 2:**

The majority of students will have a minimum of a high school certificate with very little knowledge of education practice.

Attitude

- The majority of the attendees will have high motivation and interest in the subject matter as the training is completely voluntary. CTL makes use of excellent marketing tools at the NWU to encourage participation in workshops/training/events arranged by CTL. The general attitude of attendees will be positive.

Skills Related to Delivery Mode

- All attendees must have their own mobile smartphone for use with Google Cardboard glasses. Attendees must be computer literate and able to use online search engines such as Google.
- All participants should be able to load the AR and VR applications as communicated prior to attendance. These include Google Cardboard, Google Expeditions, Google Street View.

Content Resources	Technology Resources	Instructional Facilities	Human Resources
<ul style="list-style-type: none"> ▪ User’s guide for Google Cardboards to demonstrate how to setup tools. ▪ Video to illustrate how to use Google Cardboards. ▪ A PowerPoint to show how to use the Virtual Reality and Augmented Reality software that is being utilized. ▪ A facilitator guide will be provided for the training. ▪ A train the trainer agenda will assist with understanding key concepts. ▪ A participant guide will be provided for the training. ▪ List of existing AR/VR experiences created for Teaching and Learning 	<ul style="list-style-type: none"> ▪ Each classroom will have computers, U shaped table, moveable tables, and a projector. ▪ The projector will be set up with a mirroring device to connect the facilitator's computer or tablet to the projector. ▪ There will also be a minimum of at least three Android tablets or iPads at each of the facilities. ▪ 40 Google Cardboards glasses will be provided per each location. ▪ Personal smart mobile phones and other personal mobile devices ▪ Writing supplies for the students 	<ul style="list-style-type: none"> ▪ Venues will be set up with tables in a U shaped or tables set up in a horizontal pattern facing the front of the classroom. ▪ Classroom should have a Wi-fi access. Venues should be able to accommodate all the students. ▪ All tables are moveable to accommodate the facilitation of the material. ▪ Whiteboards are standard within every classroom. Additional resources should be requested prior to the class. 	<ul style="list-style-type: none"> ▪ Three resource managers will receive training regarding Google Cardboards. These managers will provide assistance for usage and troubleshooting at each training. ▪ A Subject Matter Expert from the application build will be onsite to assist with any application related questions. ▪ Additional room modifications or accommodations will be made upon request. ▪ Instructor who is knowledgeable in technology-integrated teaching methods and competent in using AR and VR software.

According to the Pre-Course Questionnaire, many NWU staff members preferred online learning settings such as OLC(Online Learning Consortium). In order to gain the most from this training program, students will be required to attend at least one F2F session. The rewards of this program include actual experience and practice using the technological tools as well as learning teaching models. In order to enhance the learning experience of future sessions, learners will participate in discussions of ways to encourage future student participation and motivation. We suggest two options, blended instruction and flipped learning. The options below are subject to change during the other phases of the ADDIE process when incorporating feedback from stakeholders and reanalysis of the project.

1) Option A - Blended instruction

The group attends an introductory three-hour F2F(face-to-face) session. Sessions include:

- 1) Reassessment of prior knowledge of AR/VR and misconceptions
- 2) Key concepts in AR and VR
- 3) Experience the different realities.

During the practice activity sessions, learners are placed into teams and discuss how AR/VR tools can help form a rich learning environment not available in traditional learning practices. After the group discussion session, participants will be asked to share their thoughts and ideas among all learners. Online lectures regarding creation of learning materials and technological supports will be provided for four days. Lectures regarding technology-integrated teaching models such as TPACK and PICRAT can be delivered by online or offline lectures. On day 5, all learners return for a three-hour face-to-face session where they share their experiences on creating AR/VR. Learners will perform micro teaching sessions, and feedback on the created lessons will be encouraged by other learners.

▪ **Estimated Cost of Option A**

Analysis		
Designer Salary	\$33 x 20 hours =	660
Design		
Designer Salary	\$33 x 45 hours =	1485
Develop		
Resources: Google Glasses	R219.00each - 15% education discount (\$12.27) x 120	1472.4
Designer Salary	\$33 x 80 hours =	2640
Implement		
Stationary	\$15 x	1,800
Guidebook	\$12	1,440
Facilitator Salary	\$28 x 3 facilitators x 6 hours x 4 sessions = \$2016 - Pro-bono	0
Designer Salary	\$33 x 50 hours =	1650
Evaluate		
Designer Salary	\$33 x 20 hours =	660
Estimated Cost:		\$11,810.40
Estimated Cost Range:		\$9,448.32 - \$14,172.48

2) Option B - Blended instruction

In this activity, attendants will be required to learn independently using online lecture videos regarding AR, VR, and technology-integration models. Sessions following autonomous learning, student discussion, and practice activities allowing learner engagement and participation, will be predominantly F2F. Introductory sessions for Option B will mirror the introductory sessions in Option A.

The first online course content will demonstrate the features of AR and VR. This instruction is designed to close the performance gap of participants without prior knowledge regarding these technologies. After completion of the video and the independent learning away from the training, learners will participate in brainstorming and discussion activities in following F2F sessions. These activities will focus on the technology's usefulness to lectures and their implementation in the learning environment. The second online lecture will focus on creating AR/VR teaching materials. Learners will practice with applications such as Augmented Class!, HP Reveal, Metaverse, and Vizor with assistance from the lecturer, and provided guidelines. The third course will focus on technology-integration teaching models. Learners will discover that in order to maximize learning, teachers must understand how technology, pedagogy, and content knowledge interact to produce a meaningful learning experience for students (West, 2018). Using the TPACK and PICRAT models, participants will be asked to create a teaching plan and perform micro teaching sessions with the co-learners.

▪ **Estimated Cost of Option B**

Analysis		
Designer Salary	\$35 x 20 hours =	700
Design		
Designer Salary	\$35 x 45 hours =	1575
Develop		
Resources: Google Glasses	R219.00each - 15% education discount (\$12.27) x 120	1472.4
Designer Salary	\$35 x 80 hours =	2800
Implement		
Stationary	\$15	1,800
Guidebook	\$12	1,440
Facilitator Salary	\$28 x 3 facilitators x 6 hours x 4 sessions	2,016
Designer Salary	\$35 x 50 hours =	1750
Evaluate		
Designer Salary	\$35 x 20 hours =	700
Estimated Cost:		\$14,253.4
Estimated Cost Range:		\$11,402.72 - \$17,104.08

PROJECT MANAGEMENT PLAN

State & Task Name	Weeks								
	1 Oct 1-6	2 Oct 7-13	3 Oct 14-20	4 Oct 21-27	5 Oct 28-3	6 Nov 4-10	7 Nov 11-17	8 Nov 18-24	9 Nov 25-29
Analysis									
Performance Assessment									
Instructional Goals									
Learner Profile									
Resources Analysis									
Design									
Task Inventory									
F2F Meeting with the stakeholders									
Performance Objectives									
Testing strategies									
Design Brief finalisation									
Develop									
Generate content									
Media development									
Student guide									
Facilitator guide									
Formative Evaluation Summary									
Pilot test 1									
Implementation									
Prepare facilitator									
Prepare learner									
Implementation plan									
Pilot test 2									
Evaluate									
Evaluation plan (levels 1-3)									
Evaluation Instruments									
Guidelines for conducting evaluatic									
Evaluation on each phase									

ENDORSEMENT

I, Marieta Jansen van Vuuren, have reviewed the proposed analysis summary of the current state of the academic staff's perception of Augmented reality and Virtual reality at the North-West University, as well as the accompanying training option proposals. Upon consideration of all options, we have decided that delivery option _____ (Choose A or B) is best suited for our current needs within the North-West University with the following changes:

We recognize that the final implementation of the training agreed upon in this proposal is the sole responsibility will lie with the North-West University and that the training will not necessarily address training needs expressed in the stated in the goals. We hereby grant approval for the Mindbenders team to continue to enter the next phase of this project.

X _____

Date: _____/_____/_____

Dr. Marieta Jansen van Vuuren

APD Coordinator, Center for Teaching and Learning

North-West University, South Africa

X _____

Date: _____/_____/_____

Ms. Hyejin Hwang

Project Manager

Mindbenders Team

REFERENCES

Branch, R. M. (2008). *Instructional design : the ADDIE approach*. Springer.

West, R. E. (2018). *Foundations of Learning and Instructional Design Technology: The Past, Present, and Future of Learning and Instructional Design Technology* (1st ed.). EdTech Books.