EPY 717 – ANALYSIS OF APPLIED LEARNING PRINCIPLES
AND EDUCATIONAL MEDIA

UNLV Catalog Course Description
Introduction to the processes and products of educational media development & selection through the study of contributions, evaluation criteria, and production requirements essential for optimal learning situations. Includes practice in applying learning principles to educational media.

Full Course Description
This course will focus on research derived principles of multimedia learning, human computer interaction, and how their applications, coupled together, apply to the development and implementation of educational media. Course discourse will begin by providing the learner a comprehensive and focused overview of the state of scientific research on multimedia learning. Specific focus will be placed on the theory of multimedia learning, basic principles of multimedia learning, and advanced principles of multimedia learning, multimedia learning of cognitive processes, and multimedia learning within an advanced computer-based context. After a firm grasp of multimedia learning is acquired, the learner will be introduced to the ever-evolving, interdisciplinary field of Human Computer Interaction through the lens of research and professional practice. Detailed descriptions of approaches and methodologies needed to conceptualize, design, and evaluate interactive systems with human beings will be discussed. A particular interest will be placed on understanding the design principles, guidelines, and standards that surround designing human-computer interactions for diverse users. The course will conclude by discussing the broad impact of learning technology tools in educational settings.

Course Objectives
By the end of this course, students will be able to:

Knowledge
1. Identify factors that have influenced the development of various educational media products.
2. Describe the affordances and limitations of multimedia features as they relate to cognitive theory.
3. Describe the instructional principles that guide the use of educational media in specific contexts.
4. Identify specific multimedia learning principles and their application to educational media.
5. Describe the importance of the relationship between specific multimedia learning principles and educational media.

Skills
6. Apply definitions, theories, and models of educational media to classroom and digital implementations.
7. Demonstrate the ability to analyze examples of educational media products and determine the multimedia learning principle utilized.
8. Establish evaluation criteria necessary for the selection and/or production of educational media.

Dispositions
9. Appreciate the value of an empirically-grounded approach to the design, evaluation and implementation of multimedia instruction.

Overall objective
As a result of taking this course, learners will become more aware of the effective use multimedia design principles. By understanding the theoretical principles, they will also become better able to select, implement, and evaluate educational technology tools needed for positive learning outcomes for diverse learner

populations in various learning environments.

Texts, readings, and instructional resources
<u>Required Texts:</u>
1. Mayer, R. E. (2005).The Cambridge handbook of multimedia learning 2nd edition. Cambridge University Press. ISBN: 978-1-107-61031-6 (paperback)
2. Course Readings Packet (bound and available at bookstore, ask for the "EPY 717 Reader") <u>Required</u>

<u>Readings:</u> Supplemental journal articles (PDF and hyperlinked format) provided via WebCampus

Instructional Procedures
The course will operate as a seminar; students will be expected to acquire a working knowledge of approximately two to three assigned readings per week. Sessions will include a brief period of exposition, followed by a scaffolded discussion prompting summarization and critique of the prepared materials. Students will be expected to contribute to all course discussions and to periodically lead segments of discussion.

Assignments, Evaluation Procedures, Attendance, and Grading Policy ASSIGNMENT

1: In-Class Presentation of Basic Multimedia Principle
The assignment requires the learner to read 1) a specific chapter of the Mayer text which overviews a *basic* multimedia principle and 2) a related, recent (i.e., published within the last 5 years) peer-reviewed article. Using the presentation software of choice, the learner will lead a lecture-style presentation on their chosen topic (selected in during the first class session). A two-page (i.e. 500 word max) handout supplementing the presentation software should be created and distributed to students and instructor(s) prior to presentation. The presenter will be evaluated on overall presentation effectiveness. The presentation should be between 10-15 minutes in length.

Assignment Deliverables *(scored on quality of content and effectiveness of presentation)***:**
* Supplemental Handout – 10 points. Specifications include:
  o < 500 words + complementary tables & figures as warranted o
    should overview the principle as described in the chapter AND o
    the article as an exemplar of research related to the principle
* Presentation – 10 points. Specifications include:
  o < 15 minutes total
  o Summary & Demonstration of Basic Design Principle
    ▪▪ authentic examples of effective and ineffective uses of the principle
  o Summary of Research Article on this principle; summary should briefly explain:
    ▪▪ The purpose of the article as it relates to extending knowledge about the principle
    ▪▪ The data gathered (i.e. methods)
    ▪▪ The results and their implications for what we know about this principle.

ASSIGNMENT 2: In-Class Presentation of Advanced Multimedia Principle
The assignment requires the learner to read 1) the specific chapter of the Mayer text which relates to the assigned *advanced* multimedia principle and 2) a peer-reviewed research article that led to its development. Using the presentation software of choice, the learner will lead a lecture-style presentation. As in Assignment 1, a one-page handout supplementing the presentation software should be created and passed out to students and instructor(s) prior to presentation. The presenter will be evaluated on overall presentation effectiveness in addition to the basic multimedia principles learned in weeks 2-6. The presentation should be approximately 10-15 minutes.

Assignment Deliverables:
* Supplemental Handout 10 points (same specifications as above).
* Presentation 15 points (same specifications as above – 10 points) PLUS:
  Peer review of adherence to the Basic Design Principles by instructors & classmates (5 points)

ASSIGNMENT 3: Written Proposal & In-Class Presentation of a Learning Technology

Option A: Evaluating a Learning Environment

Choose a single instance of a learning technology application and evaluate it. Learning Environments include but are not limited to:

Educational Apps
An LMS course site
MOOCs
Serious Games
Simulations
ITSs
Textbook companion sites (Pearson, McGraw Hill,etc.)
Online Environments (Khan Academy)
Teachable Agents
Others with instructor permission

Questions your Overview & Critique should answer include

1. To what extent do they take basic principles into account?
2. To what extent do they make use of advanced principles?
3. What psychological or learning theories guide the design of the technology?
4. What human-computer interaction design principles, guidelines inform the design?
5. To what extent does the technology adapt to individual differences among learners?
6. (How) does the technology accommodate the needs of special populations of users?
7. What is the broad impact of the technology for learning outcomes in authentic formal and/or informal educational settings?

Option B: Designing a Learning Environment or Application

Propose a learning technology that incorporates both basic and advanced design principles in order to optimize learning. You should be able to demonstrate how the design takes into account:

- The features of the content to be learned (content, nature & depth of knowledge)
- The learner's cognitive & perceptual abilities
- The learner's motivations and preferences
- Affordances of hardware & software to deliver instruction & adapt to the learner

In addition to a proposed design, you should propose an *assessment plan* so you can evaluate the product's instructional effectiveness. Be sure to identify an evaluation methodology (i.e., participants, instruments, procedure, including timeline and proposed metrics/outcome(s) to assess).

Assignment Deliverables:
Letter of Intent 10 points (< 500 words; an example will be provided prior to the due date)
Written Proposal 25 points (< 2500 word before references)
Presentation 20 points (< 15 minutes total; evaluation criteria consistent with Assignment 2 [peer review]; a rubric will be provided in Session 13).

Credit will be awarded for the following products	Due	Points
In-Class Presentation of Basic Multimedia Principle	Week 2	20
In-Class Presentation of Advanced Multimedia Principle	Week 3	25
Written Proposal & In-Class Presentation of a Learning Technology	Weeks 10,15, & 16	55

Attendance

Students are expected to attend class. Missing a class will not result in a grade deduction; however, in-class work will occur. **In-class work <u>cannot</u> be made up** and those who are unexcused will receive a grade of 0 on in-class work assigned on days they miss. If you know you will miss a session, alert the instructor *prior* to the session so arrangements can be made. If you know you will miss an extended period of coursework, you must address this prior to exam week to avoid receiving a failing grade for the course.

Grading

Scale to determine one's letter grade. Decimals will be rounded to the nearest whole number.

A   100-95%
A-   94-90%
B+   89-87%
B   86-83%
B-   82-80%
C+   79-77%
C   76-73%
C-   72-70%
D+   69-67%
D   66-63%
D-   62-60%
F   59% and below and for any violation of academic honesty policy

UNLV POLICIES

Academic Misconduct—Academic integrity is a legitimate concern for every member of the campus community; all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility, and professionalism. By choosing to join the UNLV community, students accept the expectations of the Student Academic Misconduct Policy and are encouraged when faced with choices to always take the ethical path. Students enrolling at UNLV assume the obligation to conduct themselves in a manner compatible with UNLV's function as an educational institution. An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another, from the Internet or any source, without proper citation of the sources. See the *Student Academic Misconduct Policy* (approved December 9, 2005) located at: https://www.unlv.edu/studentconduct/student-conduct.

Copyright—The University requires all members of the University Community to familiarize themselves with and to follow copyright and fair use requirements. You are individually and solely responsible for violations of copyright and fair use laws. The university will neither protect nor defend you, nor assume any responsibility for employee or student violations of fair use laws. Violations of copyright laws could subject you to federal and state civil penalties and criminal liability, as well as disciplinary action under University policies. Additional information can be found at: http://www.unlv.edu/provost/copyright.

Disability Resource Center (DRC)—The UNLV Disability Resource Center (SSC-A 143, http://drc.unlv.edu/, 702-895-0866) provides resources for students with disabilities. If you feel that you have a disability, please make an appointment with a Disabilities Specialist at the DRC to discuss what options may be available to you. If you are registered with the UNLV Disability Resource Center, bring your Academic Accommodation Plan from the DRC to the instructor during office hours so that you may work together to develop strategies for implementing the accommodations to meet both your needs and the requirements of the course. Any information you provide is private and will be treated as such. To maintain the confidentiality of your request, please do not approach the instructor in front of others to discuss your accommodation needs.

Final Examinations—The University requires that final exams given at the end of a course occur at the time and on the day specified in the final exam schedule. See the schedule at: http://www.unlv.edu/registrar/calendars.

Incomplete Grades—The grade of I—Incomplete—can be granted when a student has satisfactorily completed three-fourths of course work for that semester/session but for reason(s) beyond the student's control, and acceptable to the instructor, cannot complete the last part of the course, and the instructor believes that the student can finish the course without repeating it. The incomplete work must be made up before the end of the following regular semester for undergraduate courses. Graduate students receiving "I" grades in 500-, 600-, or 700-level courses have up to one calendar year to complete the work, at the discretion of the instructor. If course requirements are not completed within the time indicated, a grade of F will be recorded and the GPA will be adjusted accordingly. Students who are fulfilling an Incomplete do not register for the course but make individual arrangements with the instructor who assigned the I grade.

Library Resources—Students may consult with a librarian on research needs. Subject librarians for various classes can be found here: https://www.library.unlv.edu/contact/librarians_by_subject. UNLV Libraries provides resources to support students' access to information. Discovery, access, and use of information are vital skills for academic work and for successful post-college life. Access library resources and ask questions at https://www.library.unlv.edu/.

Rebelmail—By policy, faculty and staff should e-mail students' Rebelmail accounts only. Rebelmail is UNLV's official e-mail system for students. It is one of the primary ways students receive official university communication such as information about deadlines, major campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the university. Students' e-mail prefixes are listed on class rosters. The suffix is always @unlv.nevada.edu. **Emailing within WebCampus is acceptable.**

Religious Holidays Policy—Any student missing class quizzes, examinations, or any other class or lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the instructor within the first 14 calendar days of the course for fall and spring courses (excepting modular courses), or within the first 7 calendar days of the course for summer and modular courses, of his or her intention to participate in religious holidays which do not fall on state holidays or periods of class recess. For additional information, please visit: http://catalog.unlv.edu/content.php?catoid=6&navoid=531.

Transparency in Learning and Teaching—The University encourages application of the transparency method of constructing assignments for student success. Please see these two links for further information:
https://www.unlv.edu/provost/teachingandlearning

https://www.unlv.edu/provost/transparency

Tutoring and Coaching—The Academic Success Center (ASC) provides tutoring, academic success coaching and other academic assistance for all UNLV undergraduate students. For information regarding tutoring subjects, tutoring times, and other ASC programs and services, visit http://www.unlv.edu/asc or call 702-895-3177. The ASC building is located across from the Student Services Complex (SSC). Academic success coaching is located on the second floor of SSC **A** (ASC Coaching Spot). Drop-in tutoring is located on the second floor of the Lied Library and College of Engineering TBE second floor.

UNLV Writing Center—One-on-one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, located in CDC-3-301. Although walk-in consultations are sometimes available, students with appointments will receive priority assistance. Appointments may be made in person or by calling 702-895-3908. The student's Rebel ID Card, a copy of the assignment (if possible), and two copies of any writing to be reviewed are requested for the consultation. More information can be found at: http://writingcenter.unlv.edu/.

Weekly Schedule

Session	Topic, Assigned Readings, and Assignments (to be read/submitted by the <u>beginning </u>of class on the date listed)
	DESIGN PRINCIPLES: BASIC, ADVANCED, AND EMERGING
1 1/21	*Course Welcome: An Introduction to Multimedia Learning and Human-Computer Interaction* • READ Journal Article: 9 Ways to Reduce Cognitive Load in Multimedia Learning (Mayer & Moreno, 2003) • IN-CLASS ACTIVITIES: Syllabus Review, Discussion of Multimedia & Learning Principles, **& Select Presentation Chapter (from Mayer text) for Assignment 1**
2 1/28	*Basic Multimedia Design Principles* • READ: Selected Chapter from Mayer Text & Support Article • READ Journal Article: The Episodic Buffer: A New Component of Working Memory (Baddeley, 2000) • **IN-CLASS ACTIVITIES: Student Presentations of Basic Multimedia Design Principles (Assignment 1)**, Cognitive Load Theory Discussion, & **Select Presentation Chapter (from Mayer text) for Assignment 2**
3 2/4	*Advanced Multimedia Design Principles* • READ: Selected Chapter from Mayer Text & Support Article • READ Journal Article: Multimedia Learning: Cognitive Individual Differences…(Austin, 2009) • **IN-CLASS ACTIVITIES: Student Presentations of Advanced Multimedia Design Principles (Assignment 2)** + Discussion
4 2/11	*Emerging Visual Design Principles - Space, Color & Detail* • READ Journal Article: Spatially Distributed Instructions Improve Learning (Jang, Schunn,& Nokes, 2011) • READ Journal Article: Emotional Design in Multimedia Learning (Plass et al., 2013) • READ Journal Article: A Review of Research and a Meta-Analysis of the Seductive Detail Effect (Rey, 2012) • IN-CLASS ACTIVITY: Emerging Visual Design Principles Discussion
5 2/18	*Emerging Design Principles - Embodiment: Movement & Mobility AND mLearning Principles* • READ Journal Article: Investigating …Embodied Cognition (Osgood-Campbell, 2015) • READ Journal Article: Facilitating…Visualizations: An Embodied Perspective (de Koning &Tabbers, 2011) • READ Journal Article: Augmented Visual, Auditory, Haptic, and Multimodal Feedback… (Singrist et al., 2012) • READ Journal Article: Supporting …Collaborative Environments by Haptic Force Feedback (Sallnas, 2000) • READ Journal Article: Haptic Augmentation of Science Instruction (Jones et al., 2006) • READ Journal Article: Message Design for Mobile Learning (Wang & Shen, 2012) • IN-CLASS ACTIVITY: Emerging Design Principles Discussion
	DESIGNING TO SCAFFOLD LEARNING AND INSTRUCTION
6 2/25	*Scaffolding Through Feedback & Adaptive Hints* • READ Journal Article: Exploring the Assistance Dilemma (Koedinger & Aleven, 2007) • READ Journal Article: Does Help Help (Beck, Chang, Mostos, & Corbett, 2008) • READ Journal Article: Hints: You Can't Have Just One (Goldin, Koedinger, & Aleven, 2013) • IN-CLASS ACTIVITY: Scaffolding Through Feedback & Adaptive Hints Discussion
7 3/3	*Scaffolding Though Agents & Data* • READ Journal Article: Self-Regulated Learning Environments with Pedagogical Agents (Graesser & McNamara, 2010) • READ Journal Article: Big Data for Education…(West, 2012) • IN-CLASS ACTIVITY: Scaffolding Through Agents & Data Discussion
	STANDARDIZATION: DESIGNING FOR ALL
8 3/10	*Applying Design Standards & Credentialing* • READ Journal Article: Cognitive Factors in Human Interaction with Computers (Allen, 1982) • READ Journal Article: A Conceptual Model of Human-Computer Interaction (Storrs, 1989) • READ Journal Article: The Design of Human-Computer Interfaces (Thomas,1991) • READ Journal Article: Multimedia User-Interface Design **(READING TBD)** • READ Journal Article: Universal Design of Distance Education (Burgstahler, 2001) • READ Journal Article: U.D For Instruction: A New Paradigm (Scott, McGuire, & Shaw 2003)

	• READ Journal Article: Community Collaboration: Use of Universal Design (Smith & Buchannan 2012) • VIEW Online: Universal Design Principles • READ Quality Matters for LMS Design (supplemental materials- PP Presentation and 3 pdfs) • IN-CLASS ACTIVITIES: Design Standards and Credentialing Discussion AND Quality Matters for LMS Design Workshop with Michael Wilder: Applied Case Study
9 3/17	*Assessing & Improving Design* • READ Journal Article: Design-Based Research: Putting a Stake in the Ground (Barab & Squire, 2004) • READ Journal Article: Toward A Design of Science Education (Collins, 1990) • READ Journal Article: Usability Evaluation of e-Learning Applications (Ardito et al., 2005) • IN-CLASS ACTIVITY: Assessing & Improving Design Discussion
	INDIVIDUALIZATION: DESIGNING WITH LEARNERS IN MIND
10 3/24	*Designing for Special Populations: Children & Older Adults* • READ Course Reader: Older Adults and Information Technology • READ Course Reader: Human-Computer Interaction for Kids • READ Journal Article: Finding the Education in Educational Technology…(McManis & Gunnewig, 2012). • **IN-CLASS ACTIVITY: Assignment 3 Dashboards, Data Visualizations, & Analytics Letter of Intent Due (noon deadline)**
3/31	**SPRING BREAK!**
11 4/7	*Designing for Special Populations: Users with Disabilities* • READ Course Reader: Information Technology for Communication and Cognitive Support • READ Course Reader: Perceptual Impairments • VIEW Journal Article: Universal Accessibility and Low-Literacy Population (Gribbons) • READ Course Reader: Computing Technologies for Deaf and Hard of Hearing Users • VIEW Online: Quorum Video
12 4/14	*Designing for Instructional Fit: Prior Knowledge* • READ Journal Article: Multifactor Approach to Student Model Evaluation (Yudelson, 2008) • READ Journal Article: Expertise Reversal Effect and Its Instructional Implications (Kalyuga & Renkl, 2009) • READ Journal Article: Testing the Instructional Fit Hypothesis… (Nokes et al., 2010) • IN-CLASS ACTIVITY: Adapting to Prior Knowledge Discussion
13 4/21	*Designing to Motivate Learners: Motivation & Affect* • READ Journal Article: Raising Engagement in e-learning Through Gamification (Muntean, 2011,) • READ Journal Article: Motivating Students By Personalizing Learning… (Walkington & Bernacki, 2014) • READ Journal Article: Personalized Learning Based on Students' Emotions (Herold, 2016) • IN-CLASS ACTIVITY: Motivation & Affect Discussion
14 4/28	*Designing for Multiple Individuals Learning Together: Collaboration, Dialogue, & Socially Shared Regulation* • READ Journal Article: Integrating New Technologies to Foster Student Interaction (Beldarrain, 2006) • READ Journal Article: User-Centered Design of Collaboration Technology (Olsen & Olsen,1991) • READ Journal Article: The Design of Online Learning Communities… (Charalambos et al., 2004) • READ Journal Article: Creating and Sustaining Online Learning Communities (Ryman et al, 2009) • READ Journal Article: Virtual Learning Environments (Dillenbourg, Schneider, Synteta, 2002) • READ Journal Article: Towards an Agile Approach to Adapting Dynamic Collaboration…(Adamson, 2014) • IN-CLASS ACTIVITY: Collaboration, Dialogue, & Socially Shared Regulation Discussion
15 5/7	*Designing for Creativity & Exploration: Digital Maker Spaces, Virtual Labs, & Sims* • READ Journal Article: *Lego Mindstorms, Minecraft, & other spaces* **READING TBD** • READ Journal Article: Chemistry Virtual Lab, Inq-its Physics Simulations **READING TBD** • **IN-CLASS ACTIVITY: Assignment 3 - Written Evaluation/Proposals due in class**
16 5/12	**ASSIGNMENT 3 PRESENTATIONS**