

**GEORGE MASON UNIVERSITY**  
**COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT**  
**Learning Technologies Design Research (LTDR) Program**  
**EDIT 802 – 001 (3 credits)**  
**Cognition and Technology: A Multidisciplinary Approach**  
**Fall 2016**  
**Thursdays 4:30 – 7:20 pm, Thompson L019**

**Professor:** Dr. Nada Dabbagh  
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**Prerequisites:** Admissions to PhD in Education Program or Permission of Instructor

### **Catalog Description**

Examines learning interactions between cognition and technology using multiple disciplinary perspectives including, cognitive science, psychology, neuroscience, education, design theory, instructional design, technology design, anthropology, sociology, information science, philosophy, semiotics, and linguistics.

### **Course Overview**

The course focuses on the multidisciplinary exploration of cognition and technology. Although, central to doctoral study in Learning Technologies Design Research (LTDR), students from other doctoral programs including education, computer science, psychology, philosophy, sociology, and anthropology are encouraged to participate. The course is designed to provide an opportunity for doctoral students to investigate and discuss the multiple learning sciences disciplines that guide our understanding of human learning and cognition.

### **Nature of Course Delivery**

The class format is a mixture of lectures, discussions, and group activities. Course delivery is both face-to-face and online (approximately 60-40%). Students will share multidisciplinary perspectives through in-class and online discussion/blogs of readings, conduct research on the affordances of learning technologies, contribute to an online knowledge base, and work collaboratively on interdisciplinary projects. Special emphasis may be placed on a specific learning sciences discipline in a particular semester. Such emphasis will depend on the individual student, the instructor's research area, or collective interests. Several technologies will be used to generate course content and document student learning and contributions.

## Learning Outcomes or Objectives

- Understand the multidisciplinary nature of human learning and cognition and its impact on learning technologies from a learning sciences perspective.
- Understand how knowledge is constructed, shared, internalized, and mediated through each of the perspectives examined.
- Understand the theory of affordances and its impact on the design of technology supported learning environments.
- Examine the interactions between technology and cognition and the affordances that this interaction enables.
- Analyze a variety of Technology Supported Learning Environments (TSLEs) to determine the demands they place on human learning and cognition and the ways in which the human cognitive system responds in these environments.
- Improve formal and informal learning in virtual and physical settings by generating design principles based on the theories examined.

## Professional Standards

The learning outcomes for this course align with the Design Standard for programs in Educational Communications and Instructional Technologies as established by the Association of Educational Communication and Technologies (AECT).

### *Standard 1 – Design*

- 1.1.b Identify theories from which a variety of instructional design models are derived and the consequent implications.
- 1.1.2.a Demonstrate in-depth synthesis and evaluation of the theoretical constructs and research methodologies related to instructional design as applied in multiple contexts.
- 1.1.3.b Utilize the research, theoretical, and practitioner foundations of the field in the development of instructional materials.
- 1.1.4.a Conduct basic and applied research related to technology integration and implementation.
- 1.1.5.c Articulate the relationship within the discipline among theory, research, and practice as well as the interrelationships among people, processes, and devices.
- 1.3.a Identify multiple instructional strategy models and demonstrate appropriate contextualized application within practice and field experiences.

## Required Texts

1. Norman, D. (2013). *The design of everyday things*. New York, N.Y.: Perseus.
2. Kaptelinin, V. (2014). *Affordances and design*. Denmark: The Interaction Design Foundation.

**Additional readings will be on the Blackboard course site. Students are encouraged to contribute additional articles to help build the knowledge base of this course.**

## Course Requirements and Performance Evaluation

Students are expected to submit all assignments on time in the manner outlined by the instructor (e.g., Blackboard, TK20, etc.)

There are three main course requirements or performance-based assessments:

- (1) **Class Participation and Contributions (25%):** Effective class participation involves not only preparation and communication skills, but also contributing to the online knowledge base, and commenting on peers' contributions both in-class and online. Specifically, students must make significant contributions towards building a shared interpretation of the readings and theories being discussed individually and collaboratively. This includes critical analysis of the readings through class discussion and analytic commentary using a blogging platform (e.g., WordPress) or discussion forum as assigned.
- (2) **Affordance Analysis of Digital Technologies (35%):** In small teams or individually, students will select a digital technology, software, platform, etc., and critically examine the physical, functional, and cognitive affordances of this technology, and develop a list of design affordances that are optimal for its use as a learning technology. The goal is to develop learning design criteria for each selected technology based on its technological and pedagogical affordances and ultimately a comprehensive set of design criteria that can be used to design or analyze a TSLE.
- (3) **Affordance Analysis of a TSLE (40%):** In small teams or individually, students will select a TSLE (e.g., a fully developed course, simulation, game, learning or training system) and will use the learning design criteria developed in assignment #2 to analyze the TSLE. The analysis should include: (a) a brief introduction to the analysis, (b) description of the TSLE, (c) description of the technologies used in the TSLE, (d) a description of the analysis process, (e) a description of the results, and (f) conclusions and recommendations.

## Evaluation Criteria

### Participation rubric for both in-class and online participation and contributions (20%):

- *Outstanding contributor:* contributions reflect exceptional preparation. Ideas offered are always substantive, providing one or more major insights as well as direction for the class. Frequent references are made to the readings and/or to knowledge from other sources, often showing the ability to generalize or extend the material under discussion. If this person were not a member of the class, the quality of discussion and knowledge building would be diminished markedly.
- *Good contributor:* contributions reflect thorough preparation. Ideas offered are usually substantive, providing good insights and sometimes direction for the class. Occasional references are made to the readings and/or to knowledge from other sources, sometimes showing the ability to generalize or extend the material under discussion. If this person were not a member of the class, the quality of discussion would be diminished.

- *Adequate contributor*: contributions reflect satisfactory preparation. Ideas offered are sometimes substantive, providing some useful insights but seldom offer new direction for the discussion. Some references are made to the readings and/or to knowledge from other sources but seldom generalize or extend the material under discussion. If this person were not a member of the class, the quality of discussion would be diminished somewhat.
- *Unsatisfactory contributor*: Contributions reflect inadequate preparation and/or there is little contributions in class or online. Ideas offered are seldom substantive, providing few insights and no direction for the class. References to readings are rare or non-existent. If this person were not a member of the class, the quality of discussion and knowledge building would be unchanged.

**Point assessment for Class Participation and Contributions (25%):**

	<b>Category 1</b>	<b>Category 2</b>	<b>Category 3</b>	<b>Category 4</b>
<b>Criteria</b>	Unsatisfactory Contributor	Adequate Contributor	Good Contributor	Outstanding Contributor
In-class participation	5-6	7	8	9-10
Online participation	5-8	9-11	12-13	14-15
<b>Score</b>	<b>10-14</b>	<b>16-18</b>	<b>20-21</b>	<b>23-25</b>

**Rubric for Affordance Analysis of Digital Technologies (35%):**

	<b>Category 1</b>	<b>Category 2</b>	<b>Category 3</b>
<b>Criteria</b>	Unsatisfactory Analysis	Good Analysis	Excellent Analysis
Congruency - affordances of selected technology are reflective of the technology's utility and usability	5-6	7-8	9-10
Comprehensiveness – affordances of selected technology include all applicable types of affordances and demonstrate a critical affordance analysis of the technology based on the readings	5-6	7-8	9-10
Inferences – learning design criteria are a direct result of the affordance analysis, showing progressive development, incorporation of feedback, and understanding of the affordance design process	5-6	7-8	9-10
Evidence of team collaboration (if applicable) on every aspect of this analysis	2	3-4	5
<b>Score</b>	<b>17-20</b>	<b>24-28</b>	<b>32-35</b>

**Rubric for Affordance Analysis of a TSLE (40%):**

	<b>Category 1</b>	<b>Category 2</b>	<b>Category 3</b>
<b>Criteria</b>	Unsatisfactory Analysis	Good Analysis	Excellent Analysis
All components of the affordance analysis are substantively addressed	5-6	7-8	9-10
Learning affordances design criteria are used to analyze the TSLE and clearly documented	5-6	7-8	9-10
Results of the affordance analysis are clearly documented and used to provide recommendations for improving the design of the TSLE	5-6	7-8	9-10
Evidence of team collaboration (if applicable) on every aspect of this analysis	5-6	7-8	9-10
<b>Score</b>	<b>20-24</b>	<b>25-35</b>	<b>36-40</b>

**Grading Scale:**

A = 94-100; A - = 90-93; B+ = 86-89; B = 83-85; B- = 80-82; C = 70-79; F = <70

**Professional Dispositions**

Students are expected to exhibit professional behaviors and dispositions at all times.

**Core Values Commitment**

The College of Education and Human Development is committed to collaboration, ethical leadership, innovation, research-based practice, and social justice. Students are expected to adhere to these principles: <http://cehd.gmu.edu/values/>.

**GEORGE MASON UNIVERSITY POLICIES AND RESSOURCES FOR STUDENTS***Policies*

- Students must adhere to the guidelines of the Mason Honor Code (see <http://oai.gmu.edu/the-mason-honor-code/>)
- Students must follow the university policy for Responsible Use of Computing (see <http://universitypolicy.gmu.edu/policies/responsible-use-of-computing/>)
- Students are responsible for the content of university communications sent to their Mason email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students **solely** through their Mason email account.

- Students with disabilities who seek accommodations in a course must be registered with George Mason University Disability Services. Approved accommodations will begin at the time the written letter from Disability Services is received by the instructor (see <http://ods.gmu.edu/>).
- Students must follow the university policy stating that all sound emitting devices shall be silenced during class unless otherwise authorized by the instructor.

### *Campus Resources*

- Support for submission of assignments to Tk20 should be directed to [tk20help@gmu.edu](mailto:tk20help@gmu.edu) or <https://cehd.gmu.edu/api/tk20>. Questions or concerns regarding use of Blackboard should be directed to <http://coursesupport.gmu.edu/>.
- The George Mason University Writing Center staff provides a variety of resources and services (e.g., tutoring, workshops, writing guides, handbooks) intended to support students as they work to construct and share knowledge through writing (see <http://writingcenter.gmu.edu/>).
- The George Mason University Counseling and Psychological Services (CAPS) staff consists of professional counseling and clinical psychologists, social workers, and counselors who offer a wide range of services (e.g., individual and group counseling, workshops and outreach programs) to enhance students' personal experience and academic performance (see <http://caps.gmu.edu/>).
- The George Mason University Office of Student Support staff helps students negotiate life situations by connecting them with appropriate campus and off-campus resources. Students in need of these services may contact the office by phone (703-993-5376). Concerned students, faculty and staff may also make a referral to express concern for the safety or well-being of a Mason student or the community by going to <http://studentsupport.gmu.edu/>, and the OSS staff will follow up with the student.

**For additional information on the College of Education and Human Development, please visit our website <https://cehd.gmu.edu/>.**

### Proposed Course Schedule

Date	Topics/Activities/Assignments/Due Dates	Readings for Next Class
Week 1 <b>F2F 09/01</b>	Intro to course CATS scale/TechSelect App	<ul style="list-style-type: none"> <li>Affordances and Design (Kaptelinin)</li> </ul>
Week 2 <b>Online 09/08</b>	<i>Blog contribution on week 1 readings due <u>Thursday Sept. 8 by 11:59 PM</u></i> <i>Select Digital Technology to analyze</i>	<ul style="list-style-type: none"> <li>Grudin, J. (2009). AI and HCI</li> </ul>
Week 3 <b>F2F 09/15</b>	<i>Comments on week 2 blogs due <u>Thursday Sept. 15 by 11:59 PM</u></i> <i>Discuss readings in class</i>	<ul style="list-style-type: none"> <li>Hartson, R. &amp; Pyla, P. (2012). Affordances demystified</li> <li>Bower, M. (2008). Affordance analysis</li> </ul>
Week 4 <b>F2F 09/22</b> <i>guest speaker?</i>	<i>Start list of affordances for selected technology based on week 3 readings</i>	
Week 5 <b>F2F 09/29</b> <i>guest speaker?</i>	<i>List of technology affordances due <u>before start of class on Sept. 29</u>, present/discuss in class</i>	<ul style="list-style-type: none"> <li>The Design of Everyday Things (DOET textbook)</li> </ul>
Week 6 <b>Online 10/06</b>	<i>Blog contribution on assigned DOET chapters due by 11:59 Oct. 6</i> <i>Continue working on affordance analysis</i>	
Week 7 <b>F2F 10/13</b> <i>guest speaker?</i>	<i>Comments on week 6 blogs due <u>Tuesday Oct. 11 by 11:59 PM</u></i> <b><i>Affordance Analysis Presentations</i></b>	<ul style="list-style-type: none"> <li>The Design of Everyday Things (DOET textbook)</li> </ul>
Week 8 <b>Online 10/20</b>	<i>Blog contribution on assigned DOET chapters due by <u>11:59 Oct. 20</u></i> <i>Peer feedback on affordance analysis due by <u>11:59 Oct. 20</u></i> <i>Begin developing collective learning affordances design (LAD) criteria</i>	
Week 9 <b>F2F 10/27</b> <i>guest speaker</i>	<i>Comments on week 8 blogs due by <u>11:59 Tuesday Oct. 25</u></i> <i>Develop collective LAD criteria</i>	<ul style="list-style-type: none"> <li>The Design of Everyday Things (DOET textbook)</li> </ul>
Week 10 <b>Online 11/03</b>	<i>Blog contribution on assigned DOET chapters due by <u>11:59 Nov. 3</u></i> <i>Refine LAD criteria</i>	
Week 11 <b>F2F 11/10</b>	<i>Comments on week 10 blogs due by <u>11:59 Tuesday Nov. 8</u></i> <i>Refine LAD criteria/Select TSLE</i>	<ul style="list-style-type: none"> <li>Wijekumar, K.J., et al. (2006). Technology affordances the real story n research with K-12 and undergraduate learners</li> </ul>

Week 12 <b>F2F 11/17</b> <i>guest speaker?</i>	<i>Discuss readings</i> <i>Work on TSLE affordance analysis</i>	<ul style="list-style-type: none"> <li>Belland, B.R., &amp; Drake, J. (2013). Toward a framework on how affordances and motives can drive different uses of ....</li> </ul>
Week 13 <b>11/24</b>	<b>Thanksgiving – No Class</b>	
Week 14 <b>F2F 12/01</b>	<i>Discuss readings</i> <i>Work on TSLE analysis</i>	
Week 15 <b>Online 12/08</b>	<i>Work on TSLE analysis</i>	
Week 16 <b>F2F 12/15</b>	<i>Analysis of TSLE presentations</i> <i>Analysis Report due</i>	