



## Reading Fundamentals #1: An Introduction to Scientifically-based Research

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### Introduction

Reading Fundamentals supports the concept of using scientifically-based reading research to develop an effective approach to reading assessment, instruction, evaluation, and remediation.

*An Introduction to Scientifically-based Research*, the first in the three-course Reading Fundamentals series on effective reading instruction, was designed to give background on scientifically-based instruction as it applies to federal legislation. The course discusses the research that supports scientifically-based research as it applies to effective instruction, assessment, and evaluation. The course explores myths and misconceptions concerning reading instruction and remediation. It also presents an evaluation checklist designed to assess the effectiveness of your current reading program. The goal of the course is to present you with research, trustworthy evidence, and background information that support the need for a reading program that is based on scientific research and proven methods.

This computer-based instruction course is a self-supporting program that provides instruction, structured practice, and evaluation all on your home or school computer. Technical support information can be found in the Help section of your course.

### Course Materials (Online)

Title: *Reading Fundamentals #1: An Introduction to Scientifically-based Research*  
Author: Ronald Martella, Ph.D.  
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Instructor: Dr. Karen Lea

## Academic Integrity Statement

The structure and format of most distance-learning courses presume a high level of personal and academic integrity in completion and submission of coursework. Individuals enrolled in a distance-learning course are expected to adhere to the following standards of academic conduct.

### Academic Work

Academic work submitted by the individual (such as papers, assignments, reports, tests) shall be the student's own work or appropriately attributed in part or in whole to its correct source. Submission of commercially prepared (or group prepared) materials as if they are one's own work is unacceptable.

Students are required to view/read each screen in each exercise of each chapter. Screens, exercises and chapter content may not be skipped. Students are also required to access and read all content in each course handout. A participant who fails to complete the entire course in the manner intended and as outlined, may have their grade reduced or fail the course. It is the student's responsibility to contact the facilitator, instructor-of-record, or VESi registrar if there is any question as to the manner in which this course is to be completed.

### Aiding Honesty in Others

The individual will encourage honesty in others by refraining from providing materials or information to another person with knowledge these materials or information will be used improperly.

***Violations of these academic standards will result in the assignment of a failing grade and subsequent loss of credit for the course.***

### Level of Application

This course is designed to be an informational course with application to educational settings. The curriculum suggestions and teaching strategies explained here were designed to be used for the teaching and remediation of students in kindergarten through twelfth grade. Some alterations may be needed if working with specific populations such as gifted, ESL, or special education.

### Expected Learning Outcomes

1. Describe what is meant by critical thinking.
2. Explain what science is and illustrate the six scientific principles.
3. Explain the myths and misconceptions of science, and describe the ways in which we gain information.
4. Describe the impact science has had on medicine, clinical psychology, and education.
5. Illustrate the constraint levels in educational research.
6. Explain the difference in assumptions regarding the sources of variability, the type of logic approach, and the ability to generalize results between experimental group research and single-case research.

7. Describe the concepts of reliability and validity and trustworthiness or believability of measures.
8. Explain what is meant by variability, including the sources of variability.
9. Describe the terms *internal* and *external validity*, and explain the threats to each.
10. Illustrate the different research designs/methods (i.e., experimental, single-case, causal-comparative, correlational, and qualitative).
11. Describe the importance of replications and illustrate the types of replications.
12. Describe what is meant by the term *research synthesis*.
13. Describe the difference between evidence-based and research-based practices.

## Course Description

The Every Student Succeeds Act (ESSA) outlines a clear approach for improving literacy success by supporting states in the development of effective literacy instruction and a continuum of support and interventions for those students who are at risk for reading failure. Thus, educators must have a working knowledge of evidence-based instructional strategies and approaches.

This foundational course is designed to equip learners with the essential principles of scientific research, including understanding of the scientific method, critical analysis of literature, and the fundamentals of data interpretation. Students will engage with interactive content that demystifies complex concepts, fosters analytical thinking, and cultivates an appreciation for evidence-based conclusions. Perfect for aspiring researchers, academics, and anyone with a curious mind, this course lays the groundwork for a lifetime of informed exploration and scholarly pursuit.

## Student Expectations

As a student you will be expected to:

- Students are required to view/read each screen in each exercise of each chapter. Screens, exercises and chapter content may not be skipped. Students are also required to access and read all content in each course handout.
- Complete all five section examinations, showing a competent understanding of the material presented. **You must obtain an overall score of 70% or higher, with no individual exam score below 50%, and successfully complete ALL writing assignments to pass this course. \*Please note: Minimum exam score requirements may vary by college or university; therefore, you should refer to your course addendum to determine what your minimum exam score requirements are.**
- Complete a review of any section on which your examination score was below 50%.
- Retake any examination, after completing an information review, to increase that examination score to a minimum of 50%, making sure to also be achieving an overall exam score of a minimum 70% (**maximum of three attempts**). **\*Please note: Minimum exam score requirements may vary by college or university; therefore, you should refer to your course addendum to determine what your minimum exam score requirements are.**
- Complete all course journal article and essay writing assignments with the minimum word count shown for each writing assignment.

- Complete a course evaluation form at the end of the course.

## Course Overview

### Chapter 1: Introduction to Scientifically-based Research

This first chapter contains information on what *scientifically-based research* means and discusses the myths and misconceptions of science. This chapter will lay out the basic foundation of scientifically-based research that will be used as the basis for understanding the remaining sections.

### Chapter 2: Constraint Levels, Validity & Variability in Research

This chapter will discuss the various types of research and the constraint levels in educational research. The difference in assumptions made regarding sources of variability, the type of logic approach, and the ability to generalize results between experimental group research and single-case research will be explained. There will be information on the issues of reliability and validity and trustworthiness or believability in research.

### Chapter 3: Internal & External Validity

The third chapter will deal exclusively with internal and external validity of educational research. This chapter focuses solely on these two issues due to their importance and a need for the issue or research validity to be clearly understood.

### Chapter 4: Experimental Designs

This chapter will discuss quasi-experimental designs, pre-experimental designs, true experimental designs, and single case designs. It will discuss causal-comparatives and correlational research as well as qualitative research. The chapter will also discuss objectives and methodology.

### Chapter 5: Putting It All Together

Chapter 5 wraps up the course by presenting information on replication and research synthesis. The chapter will end with a general review and prepare the user for information to be presented in the second course of this series.

## Examinations

At the end of each course chapter, you will be expected to complete an examination designed to assess your knowledge. You may take these exams a total of three times. Your last score will save, not the highest score. After your third attempt, each examination will lock and not allow further access. The average from your exam scores will be printed on your certificate. However, this is not your final grade since your required writing assignments have not been reviewed. Exceptionally written or poorly written required writing assignments, or violation of the academic integrity policy in the course syllabus, will affect your grade. As this is a self-paced computerized instruction program, you may review course information as often as necessary. You will not be able to exit any examinations until you have answered all questions. If you try to exit the exam before you complete

all questions, your information will be lost. You are expected to complete the entire exam in one sitting.

## Writing Assignments

**All assignments are reviewed and may impact your final grade.** Exceptionally or poorly written assignments, or violation of the Academic Integrity Policy (see course syllabus for policy), will affect your grade. Fifty percent of your grade is determined by your writing assignments, and your overall exam score determines the other fifty percent. ***Refer to the Essay Grading Guidelines, which were sent as an attachment with your original course link. You should also refer to the Course Syllabus Addendum, which was sent as an attachment with your original course link, to determine if you have any writing assignments in addition to the Critical Thinking Questions (CTQ) and Journal Article Summations (JAS). If you do, the Essay Grading Guidelines will also apply.***

Your writing assignments must meet the minimum word count and are not to include the question or your final citations as part of your word count. In other words, the question and citations are not to be used as a means to meet the minimum word count.

## Critical Thinking Questions

There are four CTQs that you are required to complete. You will need to write a minimum of 500 words (maximum 1,000) per essay. You should explain how the information that you gained from the course will be applied and clearly convey a strong understanding of the course content as it relates to each CTQ. To view the questions, click on REQUIRED ESSAY and choose the CTQ that you are ready to complete; this will bring up a screen where you may enter your essay. Prior to course submission, you may go back at any point to edit your essay, but you must be certain to click SAVE once you are done with your edits.

**You must click SAVE before you write another essay or move on to another part of the course.**

## Journal Article Summations

You are required to write, in your own words, a summary on a total of three peer-reviewed or scholarly journal articles (one article per JAS), written by an author with a Ph.D., Ed.D., or similar, on the topic outlined within each JAS section in the “Required Essays” portion of the course (blogs, abstracts, news articles, or similar are not acceptable). Your article choice must relate specifically to the discussion topic listed in each individual JAS. You will choose a total of three relevant articles (one article per JAS) and write a thorough summary of the information presented in each article (you must write a minimum of 200 words with a 400 word maximum per JAS). Be sure to provide the URL or the journal name, volume, date, and any other critical information to allow the facilitator to access and review each article.

To write your summary, click on REQUIRED ESSAYS and choose the JAS that you would like to complete. A writing program will automatically launch where you can write your summary. When you are ready to stop, click **SAVE**. Prior to course submission you may go back at any point to edit your summaries but you must be certain to click SAVE once you are done with your edits. For more information on the features of this assignment, please consult the HELP menu.

**You must click SAVE before you write another summary or move on to another part of the course.**

## Instructor Description

Karen Lea holds a Ph.D. in education. Dr. Lea has fifteen years' experience teaching at the K–12 level and another fourteen years' experience teaching education courses at the undergraduate and post-graduate levels. Currently she is an assessment developer at Western Governors University. Dr. Lea has been professionally published over fifteen times and has served on over a dozen panels and boards, including serving on the NCATE (CAEP) Board of Examiners.

## Contacting the Instructor

You may contact the instructor by emailing [karen\\_lea@virtualeduc.com](mailto:karen_lea@virtualeduc.com) or by calling 509-891-7219 Monday through Friday. Calls made during office hours will be answered within 24 hours. Phone conferences will be limited to ten minutes per student, per day, given that this is a self-paced instructional program. Please do not contact the instructor about technical problems, course glitches, or other issues that involve the operation of the course.

## Technical Questions

If you have questions or problems related to the operation of this course, please try everything twice. If the problem persists please check our support pages for FAQs and known issues at [www.virtualeduc.com](http://www.virtualeduc.com) and also the Help section of your course.

If you need personal assistance then email [support@virtualeduc.com](mailto:support@virtualeduc.com) or call 509-891-7219. When contacting technical support, please know your course version number (it is located at the bottom left side of the Welcome Screen) and your operating system, and be seated in front of the computer at the time of your call.

## Minimum Computer Requirements

Please refer to VESi's website: [www.virtualeduc.com](http://www.virtualeduc.com) or contact VESi if you have further questions about the compatibility of your operating system.

***Refer to the addendum regarding Grading Criteria, Course Completion Information, Items to be Submitted, and how to submit your completed information. The addendum will also note any additional course assignments that you may be required to complete that are not listed in this syllabus.***

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*Course content is updated every three years. Due to this update timeline, some URL links may no longer be active or may have changed. Please type the title of the organization into the command line of any Internet browser search window and you will be able to find whether the URL link is still active or any new link to the corresponding organization's web home page.*

*Updated 2/19/26 JN*



## COURSE SYLLABUS ADDENDUM

### **Important - Please Read - Do Not Discard**

It is each student's responsibility to read all course materials, including course syllabus and addendum, and to know and understand the course requirements, exam score minimum requirements, and deadlines. Students enrolled in VESi courses are required to check their email for any communications regarding the course until their final grade is posted with the college or university. Once your course materials are received by VESi and have been reviewed, the GRADE IS FINAL.

### Grading Criteria:

**You must obtain an overall score of 70% or higher, with no individual exam score below 50%, and successfully complete ALL writing assignments to pass this course.** This course requires a minimum overall passing grade of "C-" to receive credit. The average from your exam scores will be printed on your certificate. However, this is not your final grade since your required writing assignments have not been reviewed. Exceptionally written or poorly written required writing assignments, or violation of the academic integrity policy in the course syllabus, will affect your grade. Fifty percent of your grade is determined by your writing assignments, and your overall exam score determines the other fifty percent.

*No grade will be submitted for partial completion of course assignments, regardless of partial score. An F will be reported if course is not completed by the end of the term enrolled. Exceptions only apply to those that request an extension (must have extenuating circumstances) prior to course deadline.*

### Letters will be assigned as follows:

<b>90% to 100%</b>	<b>A</b>
<b>80% to 89%</b>	<b>B</b>
<b>70% to 79%</b>	<b>C</b>
<b>69% - lower</b>	<b>F</b>

### Course Completion Information:

Grading will take approximately two weeks from the time your materials are received by the instructor, after which we will submit grades to the college/university weekly. If you have a timeline to meet certain school or state requirements, please keep this time period in mind when planning your course completion dates.

## Course Completion Instructions:

- Once you have completed all of the course requirements, follow the instructions from the Complete Course toolbar to submit your materials to VESi's office for processing. You can only submit the course ONE TIME. Be sure that you have completed all requirements and exams.
- Course Evaluation: Please take a moment to fill out the course evaluation which is also found under the Complete Course toolbar.
- Print Certificate: You can print a copy of your course certificate for your records. Print Certificate: You can print a copy of your course certificate for your records.

## Accessing your NDSU Transcript:

After the grade for your course(s) is posted, approximately two weeks after the course submission, you can access your NDSU transcript for documentation of course completion and performance.

Instructions are found at this link: [Transcript Instructions | Continued Learning | NDSU](#)

## Drops & Refunds:

Once learners have received the course materials, they are no longer eligible for a refund. Appeals will be considered on a case-by-case basis.

## Questions or Concerns:

Please direct any questions or concerns regarding this class to [ndsudce@ndsuedu](mailto:ndsudce@ndsuedu). Please include the title of the course in your correspondence.