Transfer effects of adding seductive details to case-based instruction

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ABSTRACT

The current research investigates the efficacy of the case-based instructional method for teacher education when seductive details (i.e. interesting but extraneous details) are included or removed. Aspiring teachers ($n = 108$) learned about principles of writing effective feedback in a text-based lesson without a description of a classroom case (C control), with a classroom case that contained seductive details (SD group), or with a classroom case that did not contain seductive details (NSD group). All participants then took retention and transfer tests. Results indicated equivalent group performance on retention, but improved performance for the NSD group compared to the SD group on transfer ($d = 0.64$). Results encourage the use of cognitive design principles to support meaningful learning when using classroom cases in instruction.

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1. Introduction

Teachers, in an effort to grab students' interest, might feel compelled to interject interesting anecdotes, examples, and factoids into class materials. For example, a science teacher might add information about how many people are struck by lightning annually on a lesson about how lightning is formed in the atmosphere (Harp & Mayer, 1998), or a physical education teacher might mention how fast cheetahs run when describing short distance versus long distance running. Situational interest, interest specific to the instructional activities and materials, has been shown to be an important factor in improving student learning (Hidi, 1990; Mayer, Griffith, Jurkowitz, & Rothman, 2008). However, according to research on seductive details, content that is interesting but irrelevant to instructional objects may actually detract from learning, especially on between task transfer (Mayer et al., 2008), suggesting that not all instructional materials designed to boost situational interest positively influence learning.

Garner, Gillingham, and White (1989) coined the term "seductive details" when they found that including interesting but unimportant details in expository text decreases learning for both adolescents and adults. Since that time, examples of the deleterious effect of seductive details on recall (Harp & Maslich, 2005; Lehman, Schraw, McCrudden, & Hartley, 2007) and transfer (Mayer et al., 2008) have been documented in the educational research literature. However, despite the evidence that seductive details are harmful to some learning outcomes, investigations examining whether seductive details function differently depending on type of text largely have not been conducted, particularly when seductive details are embedded in more ecologically valid narrative texts (Lehman et al., 2007; Schraw, 1998).

In the education fields, the use of narrative texts in the form of case-based instruction has become an increasingly popular technique for engaging novice students in contextualized problem solving about teaching practice (Merseth, 1996). With case-based instruction students read, analyze, and come up with solution strategies in response to an actual or fictionalized case narrative in the context of a learning theory or instructional material (Bruning et al., 2008). Using case-based methods in teacher training is hypothesized to promote problem solving transfer by providing learners with contextualized situations in which they can deliberately work with and apply theoretical knowledge to teaching scenarios, with the hope that they will then use these solutions to frame novel teaching scenarios encountered later on during training and in teaching practice (Merseth, 1996). Developing methods to promote transfer for teachers is important, since transfer of learned materials to new tasks or applications has proven difficult to accomplish, and yet is at the heart of the learning endeavor (Goldstone & Day, 2012; Merseth, 1996). Research with teachers on problem solving and decision-making suggests failure to transfer is common, in that teachers often do not spontaneously rely on theories and principles during novel decision making but rather draw heavily on idiosyncratic experiences to guide their thinking (Borko, Roberts, & Shavelson, 2008; Merseth, 1996). For the purposes of the current study, the case-based pedagogical approach focuses on promoting cross-task transfer from one hypothetical teaching scenario to another within the teacher training context, though the ultimate goal of such knowledge transfer is to inform eventual teaching practice.

Despite its theoretical promise, case-based instruction has been used extensively in numerous disciplines with mixed results

(Moreno & Park, 2010). Some researchers have described increased complexity in thinking, increased perspective-taking abilities, and improved decision-making and problem-solving when case-based instruction is employed (Jonassen & Hernandez-Serrano, 2002; Moje, Remillard, Southerland, & Wade, 1999). However, within the body of research on case-based instruction, many of the hypothesized theoretical benefits of case instruction have yet to be empirically tested (Bruning et al., 2008; Kim et al., 2006; Merseth, 1996). In addition, some empirical research suggests that inquiry-based teaching methods such as case-based instruction are less effective than traditional models of instruction (Kirschner, Sweller, & Clark, 2006). For example, a systematic analysis of problem-based, case-based, and discovery learning showed these methods to be less effective in producing desired learning outcomes than traditional classroom methods, in part, because these methods typically do not take into consideration knowledge of cognitive processes in their design (Kirschner et al., 2006). Lack of strong empirical evidence for the effectiveness of case-based methods points to the need for careful investigation of cases as instructional tools, and case features that specifically promote learning (Bruning et al., 2008).

Drawing on the empirical literature base, one can hypothesize that the inclusion of seductive details in cases will damage transfer when learning from cases (Harp & Mayer, 1998; Lehman et al., 2007). However, much of the literature on learning with cases emphasizes that the case technique necessitates complexity and rich detail (Merseth, 1996), possibly justifying the inclusion of extraneous details such as seductive details. The current research seeks to investigate the efficacy of the case-based instructional method when seductive details are included or removed.

1.1. Case-based instruction and narrative text

Modeling after other disciplines that use the case method as a primary pedagogical tool, case-based instruction has gained popularity in teacher education since the 1980s (Merseth, 1996). Case-based instruction is an inquiry-based, student-centered pedagogical approach, where students are situated as active knowledge constructors involved in generating solutions to a meaningful task (Loyens & Rikers, 2011). While case-based instruction is often grouped with other inquiry-based approaches, such as problem-based and project-based methods, it differs from these approaches in terms of teaching practice in several ways. First, with case-based instruction learners are required to prepare in advance, by reading related learning material so that they can apply conceptual information to the case being studied (Loyens & Rikers, 2011). Second, learning from cases progresses through deliberate facilitation, in the form of guided questions (Loyens & Rikers, 2011). Third, case methods rely exclusively on the use of narrative while other forms of inquiry-based instruction might use a generalized problem or question, or an expository text as a starting point (Jonassen & Hernandez-Serrano, 2002; Loyens & Rikers, 2011).

Narrative and expository texts differ in that the narrative form provides a temporally ordered episode of human experience to convey information or support meaning making compared to expository texts which are logically sequence and factual (Polkinghorne, 1988). Narrative also functions differently from expository text as a mechanism for knowledge construction, in that narrative relies on verisimilitude for meaning making, whereas expository texts convince through logic presented in formal or empirical proof (Bruner, 1990; Jonassen & Hernandez-Serrano, 2002; Polkinghorne, 1988). Examples of narrative texts include personal biographies, fairy tales, myths, and stories that convey experience, such as case studies (Polkinghorne, 1988). The power of the narrative form rests in its ability to provide individuals with vicarious experiences that approximate lived experience, from which they can draw when faced with novel problem solving situations (Jonassen & Hernandez-Serrano, 2002). When case narratives are paired with deliberate reflection on conceptual learning material, as is the situation with case-based instruction, the conditions are therefore ripe for promoting praxis between the learning material and novel, conceptually related problems.

1.2. Promoting transfer with case-based instruction

Research on problem solving indicates that when individuals use past experience to come up with novel problem solutions, they are engaging analogical transfer (Choi & Lee, 2009; Mayer & Wittrock, 2006). Problem solving transfer occurs when learners use a prior problem solving experience to solve a new problem (Mayer & Wittrock, 2006), and analogical problem solving transfer occurs when a learner solves a new problem by relating some of its features to those of a previously solved problem. Researchers typically conceptualize problem features in two classes, surface features and structural features. Surface features are those that are specific to the characters and objects of the problem at hand, while structural features refer to the underlying system of relationships that bind together surface features (Day & Goldstone, 2012; Mayer & Wittrock, 2006). Take, for example, a math problem where students are asked to calculate, given the time it takes to reach the ground, the distance a water balloon fell when dropped out of a window (McClymer & Knoles, 1992). Here, the surface details of the case include the specifics of this particular scenario – the details about the building, the water balloon, and the window. These surface details could be swapped out with a rock dropped into a well, or an apple falling from a tree, and the essential structure of the problem would be maintained. The problem's structural details are what remain regardless of the surface features; in this particular example the structural features deal with calculating the motion of falling objects. Relating problems to each other based on structural features rather than surface features has proven difficult for learners, but is at the heart of meaningful analogical transfer (Day & Goldstone, 2012; Mayer & Wittrock, 2006). After all, the math teacher in the above scenario does not want the students to be able to only solve window problems or apple problems, but rather to recognize and solve motion problems regardless of the particulars of the situation.

Case narratives are thought to be especially effective in promoting analogical problem solving transfer since this method capitalizes on the tendency to approach problems and possible solutions from the lens of experience, rather relying solely on formalized, logic driven problem-solving frameworks (Jonassen & Hernandez-Serrano, 2002). Cross-task transfer occurs when the learner recognizes the underlying structural features of the initial case, and relates these to address a new scenario with different surface features. Since, with the case method, the learner is required to evaluate the initial case in a deliberate way, by drawing on specific learning material and guided questions from the facilitator (Loyens & Rikers, 2011), it is hypothesized that they are in a better position to understand how structural features operate in the initial case, and then use this information when working independently with new cases or scenarios. However, like many educational methods, the particularities of how the case method is employed and the features of the initial case itself likely have influence over the effectiveness of the case method on varied learning outcomes (Bruning et al., 2008).

In an extensive review of the literature that examined 974 journal articles, books, and book chapters, from disciplines as varied as medicine, education, law and business, Kim et al. (2006) identified a number of design features thought to make case instruction more effective. After the initial literature search, the researchers eliminated all references that focus solely on the general benefits of

the case method, including only those references that focus specifically on effective case design and teaching strategies using cases. Of the nearly 1000 references examined, only 100 met the search criteria. Based on suggestions from the relevant literature, the authors constructed a conceptual framework describing 17 strategies used in case design and teaching. However, since only 15 of the 100 total articles included in the review reported results from a randomized experimental design, while the other 85 articles were largely descriptive or theoretical in nature, the authors noted that the strategies cited in their article need to be further validated.

Several of the design strategies identified by Kim et al. (2006) relate directly or indirectly to the inclusion of seductive details in cases. Of particular relevance to the current investigation, they note that many researchers conjecture that authentic materials that contain engaging relevant and irrelevant information are likely to contain more ambiguity and complexity, thus leading to better decision-making and a closer approximation to real world practice. However, the advice to include engaging, irrelevant details in cases is at odds with theory and empirical evidence from the seductive details literature, and highlights the problem motivating the current research – that is, examining whether seductive details are harmful to learning when included in narrative texts such as cases.

In addition, research suggests that instructional methods that favor a one-to-one correspondence of the instructional material to the practical vocational field by including increased complexity or ambiguity do not take into consideration the pedagogical needs of novice students who do not have the background knowledge of practitioners in the field (Kirschner et al., 2006). For novice students, providing an instructional environment that encompasses all the complexity and ambiguity found in the "real-world" might actually provide a less authentic, less meaningful learning integration, likely resulting in decreased learning transfer from the case to a similar tasks, since these students might have difficulty differentiating between meaningful details in a case and details that are unrelated to the main themes of the case itself.

1.3. The role of seductive details in narrative text

Research on the seductive details effect demonstrates how situational interest influences our ability to attend to, organize, and integrate new information into existing schema in long-term memory (Harp & Mayer, 1998; Lehman et al., 2007; Mayer et al., 2008). For example, when seductive details are included in an expository text, some empirical evidence suggests attentional systems are affected, as students spend less time reading main ideas, leading to lower recall of the text itself (Lehman et al., 2007). In contrast, Mayer et al. (2008) found that the inclusion of low interest details compared to high interest details in instructional material did not impact retention. Evidence also suggests that when seductive details are included in expository text, the learner draws upon inappropriate existing schema to process the information, disrupting the appropriate integration of the learning material into long-term memory, which in turn leads to a decrease in higher-order processing and transfer (Harp & Mayer, 1998; Lehman et al., 2007; Mayer et al., 2008).

Researchers have suggested that one way to improve analogical transfer from one situation to another is by deemphasizing context-specific details, such as seductive details (Day & Goldstone, 2012). However, the majority of research on seductive details has been conducted using expository texts and retention tests (Schraw, 1998), with a few notable exceptions. Wade and Adams (1990) looked at the impact of including seductive details in biographic text on immediate and delayed recall. Biographies contain elements that are similar to narrative and expository text, and are therefore classified as mixed-text. The researchers conducted a two-part experiment, where they had one group of college students rate the interestingness and importance of sentences in a biography on a four-point scale, and another group read the biography in full, then both groups complete a free recall activity. Analyses indicated main effects for interest and importance, where interesting material was better recalled than uninteresting material, and unimportant information was better recalled than important information. There was also a significant interaction effect for interest and importance, so that high interest/high importance and high interest/low importance (seductive detail) sentences were better recalled than the other sentence categories, though not different from each other. In a follow-up study, Wade, Schraw, Buxton, and Hayes (1993) found similar deleterious effects of seductive details on recall. These results show that seductive details affect reader attention in mixed texts in potentially damaging ways since readers recalled unimportant but interesting material better than materials that are less interesting but important to main ideas or themes.

Contrary to these findings, Schraw (1998) found that while seductive details were better recalled than main ideas, seductive details did not lead to decreased recall of main ideas. Using the same biographical text (i.e. a passage about Horatio Nelson) as Wade and Adams (1990), Wade et al. (1993) and Schraw (1998) conducted a three-part study exploring the impact of seductive details on recall among undergraduate students. In the first experiment (Schraw, 1998), students rated sentences in terms of interestingness, either within or outside of the context of the entire biographical text, and then completed a free-recall test to see which and how many details were remembered. Results indicated that when rated in isolation, seductive details were found to be more interesting than main ideas, both seductive details and main ideas were found to be less interesting when they were decontextualized, and there was no difference in interest ratings for seductive details and main ideas when they were made in context. In terms of recall, sentences read in context were more memorable, and seductive details were more memorable than main ideas. Finally, Schraw (1998) found that not all seductive details are the same. He classified seductive details into two categories: context-dependent and context-independent. Context-independent seductive details dealt with themes such as death, sex, and power, and were interesting regardless of context (e.g. The arm had to be cut off in a crude amputation without anesthesia, using only a saw and a knife). Context-dependent seductive details were those that were more interesting in context and did not explicitly contain mention of sex, death, or illicit activities, but rather described secondary characters in the story (e.g. Nelson lived there with both Sir William and Lady Hamilton, with whom he entertained lavishly).

In the second experiment, Schraw (1998) examined reading time and recall for main ideas and context-dependent and independent seductive details. Results indicated that the context-dependent seductive details took longer to read than the other two types of sentences, which did not differ from each other in terms of reading times. In addition, both types of seductive details were better recalled than main idea sentences, and there was no difference in recall between seductive detail type. Schraw hypothesized that context-dependent seductive details took longer to read because they were more disruptive to the text coherence than other types of sentences.

In a final experiment, Schraw (1998) tested whether the presence of seductive details in the biographical text affected the recall of main idea sentences. Students were assigned to one of four conditions, each of which involved reading a text version that contained main ideas plus: all the seductive details; only the context-dependent seductive details; only the context-independent seductive details; or none of the seductive details. No between group differences were found on total story recall,

verbatim story recall, or main idea recall. These results indicate that within a biographical text, while seductive details are better recalled, they may not negatively affect recall of main ideas.

One possible explanation for Schraw's results (1998) is that with texts such as biographies or other types of narrative passages, the concept of what is and what is not a seductive detail becomes more vague, particularly when encountering context-dependent details. Traditionally, the conception of seductive details has been mostly limited to themes of death and sex, since these are thought to be inherently interesting (Mayer et al., 2008). However, Schraw's (1998) results challenge and expand our conception of what counts as a seductive detail with the inclusion of context-dependent details. Context-dependent details themselves might not be inherently interesting (e.g. about sex or death), but rather might be any details that, when taken in context, disrupt text coherence or distract from main ideas because of an increase in interest directed toward non-thematic ideas. In contrast, Goetz and Sadowski (1995) argue that biographical texts need to be considered in terms of their ecological validity, and that viewing interesting, non-thematic details as "seductive" is potentially inappropriate because these elements enrich our understanding of the contextual complexity contained in historical material. Therefore, further research conducted with varied text formats, including narrative texts, can deepen our understanding of how seductive details affect recall and higher-order learning, including developing complex understanding of the case leading to learning transfer to new scenarios. In addition, more research explicitly examining which details readers perceive as interesting but extraneous to narrative and mixed texts can help broaden the conception of seductive details.

1.4. The current study

The current research investigates whether the inclusion of seductive details in narrative text is harmful to learning in terms of retention of learning material and cross-task transfer. Based on the literature, several competing learning effects were hypothesized. Based on the larger body of evidence showing the damaging effects of seductive details on learning (Garner et al., 1989; Harp & Maslich, 2005; Harp & Mayer, 1998; Lehman et al., 2007; Mayer et al., 2008; Wade & Adams, 1990; Wade et al., 1993), it was predicted that students assigned to learn from a case with seductive details (SDs) would have lower cross-task transfer scores, and possibly lower retention scores than those in the No Seductive Details group (NSD). Alternately, it is possible that since cases are a form of narrative text, seductive details would not have the damaging effect on retention and transfer that they would have in expository texts, and there would not be a group difference the NSD and SD groups on either retention or transfer (Goetz & Sadowski, 1995; Lehman et al., 2007; Schraw, 1998). Based on the theory that case-based instruction supports analogical problem-solving transfer, but the lack of claim that it increases retention of factual knowledge, it was predicted that the NSD group would outperform the C group on cross-task transfer, but that either no difference between the NSD and C groups on retention would be found, or the C group would outperform the NSD group on retention (Merseth, 1996).

2. Method

2.1. Participants and design

Participants were 108 aspiring teachers enrolled in a section of one of two undergraduate educational psychology courses at a southwestern research university. In total, 30 males and 78 females participated in the study. Participants were from varied ethnic backgrounds (5 = American Indian/Alaska Native, 3 = Asian or Pacific Islander, 1 = African American, 37 = Hispanic, 44 = White, 17 = Multiple ethnicities, and 1 = Other ethnicity) and varied in age ($M = 25.44$, SD = 6.94). Most participants reported having some experience working in an educational setting (e.g. tutoring) though none indicated that they have worked as independent teachers. Participants were randomly assigned to one of three groups (for each group $n = 36$). Those in the Control group (C) did not read the classroom case. Instead, they engaged in a traditional review activity. The Case-No Seductive Details group (NSD) received the classroom case without the seductive details, as determined by a pilot study analysis. The Case-Seductive Details group (SD) received the classroom case with seductive details.

2.2. Materials

The materials consisted of a demographics questionnaire, a pretest, an instructional module, condition specific application reading and response questions, a retention posttest, and a transfer posttest. The demographics questionnaire elicited gender, age, ethnicity, and teaching experience. Two versions of a 15 item multiple-choice test were created and counterbalanced at pre- and posttest to measure students' retention of material from the learning module. The multiple-choice retention test was used instead of a free recall measure to lend greater external validity of the results, since multiple-choice retention tests are commonly used to measure learning in teacher education programs. The multiple-choice tests included questions based on basic understanding (e.g. identifying feedback as a type of formative assessment) to application-based questions (e.g. comparing the relative clarity of different feedback examples). The learning module consisted of having students read a text chapter on the principles of providing students with effective written feedback (Brookhart, 2008). The condition specific application readings were the classroom cases that either contained or excluded seductive details with corresponding reflection questions, as determined by a pilot study (see Section 2.3 below), or traditional review activity that asked students to think about a personal experience receiving written feedback and answer reflection questions paralleling those in the case condition. For the transfer posttest, participants were given a rough draft of a student essay and asked to provide written feedback.

The learning module and classroom case focused on teaching about the principles of writing effective feedback. Feedback was chosen as the subject for the learning material because of its relationship to student performance. A meta-analysis based on 607 effect sizes indicated a positive effect of feedback on performance ($d = .41$) (Kluger & DeNisi, 1996). However, just over a third of the feedback had a negative effect on performance, indicating that not all feedback has the desired result. Since, in the classroom, teachers are a primary feedback source for students, it is critical that teachers are taught how to give effective feedback. Similarly, in a massive review of meta-analyses of the effectiveness of instructional interventions, Hattie (2009) found feedback to have the single most powerful effect on student achievement.

The classroom case was a narrative description of a teacher providing students with feedback on a written assignment, based loosely on *The Research Paper,* from Ormrod and McGuire's (2007) *Case Studies Applying Educational Psychology.* The case depicts a seventh grade teacher who assigns his students a research paper to be completed in two drafts. Upon receiving the first draft, the teacher corrects spelling and grammar errors, and provides some very general comments, but fails to provide conceptual suggestions to his students. When he receives the final drafts of the paper, he is surprised to see that his students corrected the mechanical errors that he pointed out, but did not improve their papers in more substantive ways.

The case was written to include numerous potential context dependent seductive details throughout, such as the following statement about student performance on large-scale standardized assessment results: *In 2007, only 26% of Mesa's ninth grade students scored proficient or better on the New Mexico Standards Based Assessment (SBA) for reading, compared to 44% state-wide scoring proficient or better on this test.* In a non-teacher education context, the above statement about standardized test performance might not be highly interesting either in or out of context and therefore potentially seductive. However, research suggests that teachers have heightened emotional reactions to standardized assessment, including anxiety and stress (Mulvenon, Stegman, & Ritter, 2005), so it is plausible that framing the student population in the case in terms of their standardized test performance will stir the interest of the student teachers when reading the case. In addition, this detail may be relevant to some learning material, but it is not directly tied to the learning material at hand (i.e. applying feedback best practices) so might rightly be classified as a seductive detail.

The body of the case is followed by three questions designed to invoke reflective thinking based on the prompts used by Harrington (1999), designed to help students properly frame the case's problem, connect theory to practical aspects of the case, and reflect on personal theories and strategies for addressing case issues. Students in the C group received the traditional review activity in place of the classroom case. Instead of reading the classroom case, students were asked to reflect on a time they received feedback, following the same general prompts used in the classroom case conditions described above.

The transfer posttest was designed to measure how well students are able to apply the learning material to providing actual feedback on student work. Students read an actual student's short essay (Northwest Regional Educational Lab, 1998), and were prompted to provide the student with feedback with the following:

> Imagine you are a fifth grade language arts teacher. You have been teaching your students about the 6+1 Trait® Writing Model, and are currently working on teaching your students about Organization. According to the 6+1 Trait® Writing Model, Organization deals with having an attention-grabbing introduction, linking the introduction and conclusion, sequencing logically and clearly, and transitioning from one idea to the next smoothly. To help your students apply what they learned about Organization to their writing, you assigned your students a short essay about what they did over the weekend, and you just collected the first of two drafts of the assignment. Below is one student's first draft. Using the guidelines you learned about today, provide this student with written feedback that will help prepare them to write a second draft. You may write on any part of the page as you provide your feedback.

2.3. Pilot study

Case details were classified as seductive details in a two-part pilot study, where a sample of novice teacher education students (n = 11) and a sample of educational psychology graduate students with greater expertise in feedback principles (n = 9) rated the relevance of each case sentence to the learning material on a dichotomous scale (essential or non-essential). The novice students also rated the interestingness of each sentence. While not true experts on feedback, relative to the undergraduate participants, the graduate student raters reported a much more in-depth understanding of feedback, both in principle and practice. Eight participants reported studying the principles and practice of feedback in graduate coursework, three reported teaching the concepts of feedback best practice within a college course, one reported conducting extensive

literature review on feedback, and two reported conducting research on feedback. In addition, all but two of the participants reported some teaching experience, with three reporting PK-12 teaching and five reporting working as either an instructor of record at the college level or a faculty member at a college/university. On average, participants had 4.39 years experience teaching at the college level (SD = 3.92).

After reading the chapter on feedback best principles (Brookhart, 2008), raters in each group were asked to examine each sentence of the proposed classroom case in terms of its relation to the learning material on feedback principles, using the following prompt: *Consider how the content of each of the sentences below relates to what you learned about providing students with written feedback. For each sentence rate whether the content is pertinent to understanding how feedback was used in this case by circling either essential or non-essential.* In addition, the undergraduate students were given the additional prompt, *For each sentence, circle whether the content is interesting or uninteresting to you.* After each group of raters completed rating the case, ratings for each sentence were analyzed using a content validity ratio (Lawshe, 1975; Rungtusanatham, 1998):

$$CVR_i = \frac{n_e - \frac{N}{2}}{\frac{N}{2}}$$

where CVR_i is the content validity ratio for the item; n_e is the total number of *essential* ratings for the item across raters and N is the total number of raters.

For each sentence, the total number of ratings of *essential* were tabulated, and the *CVR* was calculated. For example, if half of the raters rated a sentence as essential, the *CVR* score would equal zero, if all of the raters rated the sentence as essential, the *CVR* score would equal 1, and if none rated it as essential, it would equal -1. Therefore, the closer the *CVR* score is to zero, the more rater disagreement there is about the item. Using null-hypothesis testing, Lawshe established the significance criteria for when an item can be considered different from non-essential. For example, according to a one-tailed significance test at α = .05 and a sample of 11 raters total, any rating with a *CVR* score less than .59 may be considered non-essential. This process was then repeated for interestingness ratings. The essentialness ratings from the novice sample were compared to the ratings from the more expert sample. When disagreement arose between two groups in terms of whether or not a sentence related to understanding the instructional material about feedback, the graduate student ratings were maintained since they more fully understood the concepts and practices of feedback, so it was assumed that they could better filter which details were related to the main themes of the case. In total, four sentences from the case were classified as seductive details, as they were rated as both interesting to undergraduates and non-essential to understanding the case in terms of the principles of effective written feedback. Table 1 shows the CVR ratings for both groups of raters on all case sentences, and indicates which sentences were coded as seductive details.

As noted in Table 1, the case details that were identified as seductive details (both interesting and non-essential) dealt with student ethnicity, poverty status, achievement on standards based assessment, plus teacher background information. These examples demonstrated that some case details that might seem dull out of context are deemed interesting by readers when included in narrative text.

2.4. Procedure

After granting informed consent, participants were randomly assigned to one of three treatment groups and were given a packet

Table 1
Expert and novice teachers' essentialness and interestingness ratings for each case sentence.

Sentence	CVR essential novice, expert	CVR interesting novice
1. Mesa Middle School is a medium size school located in a small town in northern New Mexico	.09, −1.0	−.09
2. Approximately 92% of the students are Hispanic, 2% are white, 1% are African American and 5% are American Indian	−.09, −1.0	.82[b]
3. Of the 540 students attending Mesa, approximately 86% of students are eligible for the Free and Reduced lunch program	−.27, −1.0	.64[b]
4. In 2007, only 26% of Mesa's ninth grade students scored proficient or better on the New Mexico Standards Based Assessment (SBA) for reading, compared to 44% state-wide scoring proficient or better on this test	.82[a], .33	.64[b]
5. Mr. Garcia has been teaching seventh-grade English at Mesa Middle School for 2 years, since the beginning of his career	.09, −.33	.27
6. He grew up in northern New Mexico, and feels a special kinship to his students and their families	−.27, −.56	.45
7. He decided to become a teacher to give back to his community, and to help inspire young minds to meet their full potential	−.09, −.78	.64[b]
8. This year, Mr. Garcia has decided to assign his students a 10-page research paper on a topic of their choice, due at the end of the semester	1.0[a], .78[a]	.64[b]
9. He has never assigned such a long paper to his seventh-graders, but thinks this assignment will give his students the chance to improve their writing and critical thinking skills	.82[a], .33	.45
10. Since his students haven't written such a long paper before, he decides to assign a rough draft due 2 weeks in advance, so that he can provide them with feedback	.82[a], .78[a]	.64[b]
11. Mr. Garcia collects the rough drafts of the research paper on a Friday, and promises his students that he will grade them over the weekend and return them with feedback they can use for the final drafts of their research papers	.64[a], −.11	.09
12. On Saturday morning, he pulls out his red pen and gets to work	−.82, −.78	−.45
13. On each paper, Mr. Garcia makes sure to pay strict attention to correcting any mechanics problems, by underlining mistakes and telling the students how to fix them	1.0[a], 1.0[a]	.45
14. He saves any additional written feedback for the end of the paper, where he writes his general impression of the work	.64[a], 1.0[a]	.45
15. For example, Susana handed in a paper on her favorite contestant on *American Idol*, and Mr. Garcia wrote "Good job! I liked Crystal the best this season too."	.64[a], .56	.45
16. He tries to keep all his comments positive and general, even if the paper isn't very good, because he does not want to turn his students off from writing	.64[a], 1.0[a]	.45
17. He figures he should save any criticisms for the final research paper, because by that point he thinks his students will be much more confident in their work	.45, 1.0[a]	.64[b]
18. Besides, he thinks, isn't the point of a rough draft simply to get your ideas out their on the page, so that they can be refined for the final draft?	.27, .78[a]	.27
19. On the day the final research papers are due, Mr. Garcia collects them and then dives into grading them as soon as he has a free period	.09, −1.0	−.09
20. He is excited to see how the papers developed since the rough draft stage	−.64, −.78	−.09
21. As he starts to grade, however, he notices that most students didn't improve the content of their work at all	.82[a], .78[a]	1.0[b]
22. Instead, they just made the corrections to grammar and mechanics that Mr. Garcia had pointed out in the rough drafts!	.82[a], 1.0[a]	1.0[b]

Seductive details are bolded.
[a] Rated as essential to understanding the case in the context of the learning material.
[b] Rated as interesting.

containing paper and pencil versions of all study materials. After completing the demographics questionnaire, participants took the multiple-choice pretest, and learned about feedback by reading the learning module chapter. Then, participants read the classroom case and responded to the related reflection questions (the SD and NSD groups) or engaged in the traditional review assignment (C). Next, the participants responded to the multiple-choice retention test and then the transfer posttest. Upon completion of the learning measures, participants were given the opportunity to ask any questions about the study, were given a debriefing form to be turned in to their classroom instructor for course credit, and were thanked for their participation.

Performance on the retention test was calculated for each participant by adding the number of correct answers from the multiple-choice posttest. Following scoring, the reliability of the two multiple tests at pretest and posttest were estimated. Internal consistency for each of the retention test forms was low at pretest (From A, $\alpha = .081$; Form B, $\alpha = .335$), though improved at posttest (Form A, $\alpha = .559$; Form B, $\alpha = .503$). In addition, the correlation between pretest scores and posttest performance on both the retention and transfer tests was low ($r = .087$; $r = .364$ respectively). Therefore, the pretest scores were not used as a covariate in the following analyses, and retention posttest results should be interpreted cautiously.

The transfer posttest was scored using an analytic scoring rubric that rated the clarity, tone, specificity and overall quality of the participants' feedback on the transfer task. The rubric was designed to measure the participants' use of feedback best practices in a novel, applied setting, and was aligned to the key concepts in the instructional chapter. Category scores were summed to determine an overall feedback quality score, where 0 reflected the poorest quality feedback and 16 the highest quality feedback (see Appendix for the complete transfer scoring guide). A scorer unaware of the participants' condition scored all the transfer tasks, and two reliability scorers each scored a randomly chosen subsample of the transfer test responses (interrater agreement, Cronbach's $\alpha = .84$). Disputes in scoring on the transfer task were resolved through discussion, resulting in 100% agreement.

3. Results

The major question addressed in this study concerns how to design effective case-based descriptions for teachers in preparation. If seductive details help provide context, then the SD group should outperform the other groups. If seductive details disrupt the process of knowledge construction, then the NSD group should outperform the other groups. Table 2 shows the mean and standard deviation of each of the three groups in the retention posttest and the transfer posttest.

To test the effect of including seductive details in the classroom case on retention of learning material, an ANOVA with group as the between subjects factor and retention posttest as the dependent variable was conducted. Separate ANOVAs for each of the dependent variables (retention and transfer) were conducted rather than

Table 2
Retention and transfer means and standard deviations by group.

Group	N	Retention		Transfer	
		M	SD	M	SD
SD	36	11.75	2.05	6.39	3.76
NSD	36	12.06	1.93	8.78	3.71
C	36	12.39	2.21	7.22	4.57

Note: Potential scores ranged from 0 to 15 on the retention test, and 0–16 on the transfer test. SD = Seductive Details group, NSD = No Seductive Details group, C = control group.

a single MANOVA since the correlation between retention posttest and transfer was small ($r = .235$). Results indicated no between group differences on the retention test between SD ($M = 11.75$), NSD ($M = 12.06$), or C ($M = 12.39$) groups, $F(2,105) = .863$, $p = .425$. The failure to detect a difference between SD and NSD groups on retention is consistent with prior seductive details research (Mayer et al., 2008).

Second, to test the effect of seductive details in cases on transfer, an ANOVA with group as the between subjects factor and total transfer score as the dependent variable was conducted. The results indicated an overall condition effect on transfer scores $F(2,105) = 3.356$, $p = .042$. Follow up pairwise comparisons employing a Bonferroni adjustment indicated that the NSD group ($M = 8.78$) outperformed the SD group ($M = 6.39$) on transfer, $p = .040$, $d = .64$. No differences were found between either the NSD and the C ($M = 7.22$) groups or the SD and the C groups. These results suggest that when cases are designed to omit seductive details, they are more effective in promoting analogical transfer to a novel teaching situation than when seductive details are included.

4. Discussion

4.1. Empirical contributions

This study investigated whether the inclusion of seductive details in learning materials affects student retention and learning transfer when engaging in an instructional module employing case-based instruction. Results indicated that the NSD group and the other groups had no detectable difference on retention tests. However, in terms of transfer, the NSD group outperformed the SD group, suggesting that, cases, when they are designed to exclude seductive details, are more effective learning tools for promoting learning transfer than when they include seductive details. However, despite higher mean sores at posttest for the NSD group, no statistically significant difference between the NSD group and the C group was found on the transfer posttest. Practically, the current results are quite meaningful in that they demonstrate the powerful effect of seductive details on learning. The inclusion of just four extra sentences in the classroom case lead to a decrease in learning with a medium effect size ($d = .64$).

These results are similar to prior research outcomes that show that seductive details damage learning transfer (Garner et al., 1989; Mayer et al., 2008). However, no evidence was found that reading a case either with or without seductive details impacted retention of learning material studied just prior to the case intervention. The lack of evidence for group differences on retention is similar to Schraw's (1998) findings with biographical text, suggesting that seductive details might be less disruptive to retention when present in narrative and mixed texts compared to expository texts. This may be due to increased coherence in narrative texts. However, since the retention measure in the current study was found to have relatively low reliability, it is possible that no group differences on retention were found due to lack of statistical power.

4.2. Theoretical and practical contributions

Theoretically, the results from the current study suggest that seductive details function similarly in narrative cases and expository texts, and that the efficacy of case-based instruction relies in part on carefully designing case materials. For novice teachers, when classroom cases are designed to take into account cognitive learning principles, by removing seductive details, cases instruction worked better to promote analogical transfer. Similarly, other cognitive-based principles that guide student learning, such as signaling key details in cases (Moreno & Abercrombie, 2010), might

also promote effective learning transfer when learning with cases. The results of the current study are less clear in terms of the benefits of case-based instruction over other types of instruction, such as the review activity used for the control group. While the results provide evidence that learning from cases is improved when attention is paid to the design of the case itself, the superiority of the case method over other instructional methods was not conclusively demonstrated in this study. More investigation into the design features of cases, and explicit comparison between case-based methods and other instructional methods can help elucidate whether case-based instruction is a particularly useful teaching method for promoting transfer.

Practically, this study provides concrete evidence that including seductive details in cases may damage student learning. Rather than attempting to enrich case-based instructional materials through the employment of seductive details, instructional designers might better serve novice students by devoting their attention to drawing out the most salient features in the cases related to the instructional content, so that students might grow a greater awareness of the implicit complexity contained within any single issue. While this approach might not highlight the quantity of issues that one might attend to when involved in any classroom scenario, it promises to make instruction more meaningful by promoting transfer to novel practical settings.

In addition, the results from the pilot study demonstrate that careful consideration needs to be given to the types of details classified as seductive details in texts. In expository text, the traditional classification of seductive details depends on inherently interestingness, such as details focused on sex and death (Mayer et al., 2008). The current study provides evidence that in mixed and narrative text, context-dependent details might function as seductive details, and their presence in text decreases learning. More focus needs to be given to how cases and other narrative texts are designed and used so as to take into account the seductive details effect. This poses a particular challenge, since the nature of seductive details might shift depending on instructional goals, and on the experience level of the reader.

4.3. Limitations and future directions for research

The current study has several limitations that bear on both the reliability and the generalizability of the results. First, as noted in the Section 2.4 above, the multiple-choice measure had low reliability at posttest, indicating that the results on the retention measure might not represent dependable scores of knowledge of a single construct. Improving the measure might yield more reliable results, and give a better idea of actual student retention from the intervention. In addition, the current study did not model the effects of context-dependent versus content-independent seductive details in cases. Future research that deliberately compares seductive detail type could extend knowledge about the learning influence of context-dependent and context-independent seductive details when used in case-based narratives.

As with any study conducted in a laboratory setting with a single intervention, there are limits to the interpretability of the results, since these conditions do not match those found in actual instructional environments. In particular, the laboratory setting might impede successful learning, where stakes are low, since learning the material is not tied to a course grade or other performance outcome in which the students are more personally invested. In addition, the laboratory setting does not contain the rich and contextualized environment features found in actual classrooms where the learning materials are augmented with other instructional supports beneficial to student learning. Finally, the results are limited in terms of sample representation. The sample represented only a small cross-section of teacher education stu-

dents from a southwestern university, which may differ in substantive ways from teacher education student populations in other areas of the country and the world. Additional studies confirming these results with other populations of students can clarify the generalizability of the results.

Several potential directions for future research come out of the current study. Research on teacher decision-making indicates that while novice teachers struggle to actively draw upon theories, beliefs, objectives, and limited experiences during the decision-making process, more experienced teachers make classroom decisions more automatically, since they have much broader experiential schema to draw from (Borko et al., 2008). It is hypothesized that simulations, such as cases, can help novice teachers build their teaching schema, thus lightening cognitive effort needed during actual classroom decision-making, thereby increasing the likelihood that novice teachers will link theory to practice. However, research on the expertise reversal effect indicates instructional strategies that have been shown to reduce the cognitive load of novice students are not necessarily effective for more experienced learners (Kalyuga et al., 2003). For example, evidence shows that the perception of text coherence is actually different for expert and novice learners, so that what looks like a minimally coherent text for a novice is actually fully coherent for an expert. Similarly, the research examining text coherence differences for experts and novices focuses on including more redundant details for novice students in order to boost text coherence (Kalyuga, Ayers, Chandler, & Sweller, 2003). It is not clear if the elimination of details that increase text incoherence, such as seductive details, will have the same functional effect found in prior research. Further investigation into how experts and novices process texts with seductive details can help elucidate whether the expertise reversal effect applies to learning from cases.

Second, the role student characteristics play in learning from cases is ripe for investigation. For example, cognitive, conative, or affective characteristics not tested here might affect how individuals learn from cases. In addition, demographic characteristics, such as student gender, ethnicity, or culture might influence which details are classified as seductive details, and which are characterized as simply unrelated and uninteresting. An investigation into these differences is particularly salient when using a case intervention such as presented in the current study, since student characteristics present in the case, including ethnicity, poverty status, chronic low achievement on standards-based assessment, and the teacher's sense of community relatedness were the only details classified as seductive details.

A third possible direction for research is looking at whether teaching type and quality plays a moderating or mediating role when examining the effects of case design on learning from cases. In the current study, case details were examined while instructional conditions were held constant in order to identify if the case details alone have an impact on learning. However, in a real-world teaching environment, it is likely that both the case itself and the teaching strategies that are paired with the case influence subsequent learning.

Appendix A. Supplementary material

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.cedpsych.2013.01.002.

References

Borko, H., Roberts, S. A., & Shavelson, R. (2008). Teachers' decision-making: From Alan J. Bishop to today. In P. Clarkson & N. Presmeg (Eds.), *Critical issues in mathematics education* (pp. 37–67). New York: Springer.

Brookhart, S. M. (2008). *How to give effective feedback to your students*. Alexandria, VA: Association for Supervision and Curriculum Development.

Bruner, J. S. (1990). *Acts of meaning*. Cambridge, MA: Harvard University Press.

Bruning, R., Siwatu, K. O., Liu, X., PytlikZillig, L. M., Horn, C., Sic, S., et al. (2008). Introducing teaching cases with face-to-face and computer-mediated discussion: Two multi-classroom quasi-experiments. *Contemporary Educational Psychology, 33*, 299–326.

Choi, I., & Lee, K. (2009). Designing and implementing a case-based learning environment for enhancing ill-structured problem solving: Classroom management problems for prospective teachers. *Educational Technology and Research Development, 57*, 99–129.

Day, S. B., & Goldstone, R. L. (2012). The import of knowledge export: Connecting findings and theories of transfer learning. *Educational Psychologist, 47*, 153–176.

Garner, R., Gillingham, M. G., & White, C. S. (1989). Effects of 'seductive details' on macroprocessing and microprocessing in adults and children. *Cognition and Instruction, 6*, 41–57.

Goetz, E. T., & Sadowski, M. (1995). Commentary: The perils of seduction: Distracting details or incomprehensible abstractions? *Reading Research Quarterly, 30*, 500–511.

Goldstone, R. L., & Day, S. B. (2012). Introduction to "new conceptualizations of transfer learning". *Educational Psychologist, 47*, 149–152.

Harp, S. F., & Maslich, A. A. (2005). The consequences of including seductive details during lecture. *Teaching of Psychology, 32*, 100–103.

Harp, S. F., & Mayer, R. E. (1998). How seductive details do their damage: A theory of cognitive interest in science learning. *Journal of Educational Psychology, 90*, 414–434.

Harrington, H. L. (1999). Case analyses as a performance of thought. In M. Lundeberg, B. Levin, & H. Harrington (Eds.), *Who learns what from cases and how? The research base for teaching and learning with cases* (pp. 29–47). Mahwah, NJ: Erlbaum.

Hattie, J. (2009). *Visible learning: A synthesis of 800 meta-analyses relating to achievement*. New York: Routledge.

Hidi, S. (1990). Interest and its contribution as a mental resource for learning. *Review of Educational Research, 60*, 549–571.

Jonassen, D. H., & Hernandez-Serrano, J. (2002). Case-based reasoning and instructional design: Using stories to support problem solving. *Educational Technology Research and Development, 50*, 65–77.

Kalyuga, S., Ayers, P., Chandler, P., & Sweller, J. (2003). The expertise reversal effect. *Educational Psychologist, 38*, 23–31.

Kim, S., Phillips, W. R., Pinsky, L., Brock, D., Phillips, K., & Keary, J. (2006). A conceptual framework for developing teaching cases: A review and synthesis of the literature across disciplines. *Medical Education, 40*, 867–876.

Kirschner, P. A., Sweller, J., & Clark, R. E. (2006). Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching. *Educational Psychologist, 41*, 75–86.

Kluger, A. N., & DeNisi, A. (1996). The effects of feedback interventions on performance: A historical review, a meta-analysis, and a preliminary feedback intervention theory. *Psychological Bulletin, 119*, 254–284.

Lawshe, C. H. (1975). A quantitative approach to content validity. *Personnel Psychology, 28*, 563–575.

Lehman, S., Schraw, G., McCrudden, M. T., & Hartley, K. (2007). Processing and recall of seductive details in scientific text. *Contemporary Educational Psychology, 32*, 569–587.

Loyens, S. M. M., & Rikers, R. M. J. P. (2011). Instruction based on inquiry. In R. Mayer & P. Alexander (Eds.), *Handbook of research on learning and instruction* (pp. 361–381). New York: Routledge.

Mayer, R. E., Griffith, E., Jurkowitz, I. T. N., & Rothman, D. (2008). Increased interestingness of extraneous details in a multimedia science presentation leads to decreased learning. *Journal of Experimental Psychology: Applied, 14*, 329–339.

Mayer, R. E., & Wittrock, M. C. (2006). Problem solving. In P. Alexander, P. Winne, & G. Phye (Eds.), *Handbook of educational psychology* (pp. 287–303). Mahwah, NJ: Erlbaum.

McClymer, J. F., & Knoles, L. Z. (1992). Ersatz learning, inauthentic testing. *Journal on Excellence in College Teaching, 3*, 33–50.

Merseth, K. K. (1996). Cases and case methods in teacher education. In J. Sidkula (Ed.), *Handbook of research on teacher education* (2nd ed., pp. 722–744). New York: Macmillan.

Moje, E. B., Remillard, J. T., Southerland, S., & Wade, S. E. (1999). Researching case pedagogies to inform our teaching. In M. A. Lundeberg, B. B. Levin, & H. L. Harrington (Eds.), *Who learns what from cases and how? The research base for teaching and learning with cases* (pp. 73–94). Mahwah, NJ: Erlbaum.

Moreno, R., & Abercrombie, S. (2010). Promoting awareness of leaner diversity in prospective teachers: Signaling, individual and group differences within virtual classroom cases. *Journal of Technology and Teacher Education, 18*, 111–130.

Moreno, R., & Park, B. (2010). Cognitive load theory: Historical development and relation to other theories. In J. L. Plass, R. Moreno, & R. Brünken (Eds.), *Cognitive load theory* (pp. 9–28). New York: Cambridge.

Mulvenon, S. W., Stegman, C. E., & Ritter, G. (2005). Test anxiety: A multifaceted study on the perceptions of teachers, principals, counselors, students, and parents. *International Journal of Testing, 5*, 37–61.

Northwest Regional Educational Lab (1998). *Improving classroom assessment: A toolkit for professional developers (Toolkit 98)*. Portland, OR.

Ormrod, J. E., & McGuire, D. J. (2007). *Case studies: Applying educational psychology* (2nd ed.). Upper Saddle River, NJ: Pearson.

Polkinghorne, D. E. (1988). *Narrative knowing and the human sciences*. Albany, NY: State University of New York Press.

Rungtusanatham, M. (1998). Let's not overlook content validity. *Decision Line, 29*(4), 10–13.

Schraw, G. (1998). Processing and recall differences among seductive details. *Journal of Educational Psychology, 90*, 3–12.

Wade, S. E., & Adams, R. B. (1990). Effects of importance and interest on recall of biographical text. *Journal of Reading Behavior, 22*, 331–353.

Wade, S. E., Schraw, G., Buxton, W. M., & Hayes, M. T. (1993). Seduction of the strategic reader: Effects of interest on strategies and recall. *Reading Research Quarterly, 28*, 3–24.