

The feasibility of a student-centred approach to the presentation of vicarious experience information within online learning

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Abstract

Previous researchers have emphasised the need for more student-centred approaches to online learning. This study presents and assesses the feasibility of a tailoring system, which adapts vicarious experience information to best benefit the learners' self-efficacy (SE), based upon the model–observer similarity hypothesis. This hypothesis states that the benefit of vicarious experience information is positively correlated with the levels of similarity between the model within the information and the individual observing it.

Participants took part in online learning, which included a set task. Before completing the set task, they were shown vicarious experience information in the form of a fictional testimonial from a previous individual who had completed the task. Participants were exposed to one of two types of testimonials: a testimonial chosen by the tailoring system to ensure high levels of model–observer similarity, or a generic testimonial.

Overall, the results found that using a tailoring system to ensure high levels of model–observer similarity did result in the testimonial information having a more positive effect on an individual's task-specific SE when compared to generic testimonial information. The results support the feasibility of tailoring within online learning to increase the effectiveness of testimonial information in increasing an individual's efficacy beliefs.

Keywords: learning processes; educational research; behaviour and personality; computer-assisted learning.

1. Introduction

Recently, there has been a growth in the number of students within higher education using online methods of learning in comparison to face-to-face methods (Levy, 2007; Brett, 2004). Students appear to favour this change, with many of them more likely to use online learning (OL) methods compared to traditional ones to acquire new knowledge (Costley et al., 2017; Prior et al., 2016). It is easy to understand why this is the case as OL offers many benefits to the learner. For example, OL offers flexibility, allowing students to take charge of their own study paths (Costley et al., 2017; Monterio et al., 2017).

OL can be considered as a learning process in which all the material and work are presented online (Kauffman, 2015). Due to the benefits outlined, there has been a surge in the amount of OL courses offered by higher education establishments in recent years (Levy, 2007). However, this transition has not come without its own problems (Allen & Seaman, 2015), with OL having some current disadvantages when compared to its face-to-face counterpart (Boston & Ice, 2011). Previous research has suggested that OL has lower levels of engagement (Allen & Seaman, 2015; Boston & Ice, 2011), possibly due to its self-regulated and isolated nature (Martin & Bolliger, 2018).

When considering a student's level of engagement in learning, self-efficacy (SE) is a key construct (Linnenbrink & Pintrich, 2003). SE can be defined as an individual's belief that he/she is able to succeed in a specific event or task that they encounter (Bandura, 1977). SE can be general (belief in being able to be successful at any task that they are faced with in general) or task-specific (belief in being able to be successful at a particular, defined task). This allows individuals to have multiple SE beliefs about themselves at any one time (Tuck et al., 1995; Sadri & Robertson, 1993). An individual's SE can affect how he/she feels, thinks and motivates himself/herself (Bandura, 1977). Because of this, an individual's SE beliefs may have an influence on how he/she behaves within the OL process, as those with lower SE may be more likely to disengage.

To tackle the issue of disengagement, previous researchers have promoted the use of more student-centred approaches to OL (Martinez, 2003; Karaksha et al., 2013; Bakki et al., 2015; Czerkowski & Lyman, 2016; Nandi et al., 2015; Segrave & Holt, 2003). It is suggested that currently OL lacks the appropriate personalised support for each of its learners, which is present in more traditional forms of learning (Martinez, 2003). To increase engagement, it is the active job of the learning providers themselves to consider each learner on a one-to-one basis and design experiences that cater to their learning needs (Wadsworth et al., 2007). Czerkowski and Lyman (2016) state that it is critical that OL moves away from its current 'one size fits all' approach and starts to incorporate key learner characteristics into the learning process.

The study presented in this paper explores the use of the model–observer similarity hypothesis to create a more student-centred approach in OL by increasing the relevance of vicarious experience information (VEI) presented to learners. VEI is described as information about others, sometimes referred to as models (Bandura, 1977). If we see someone whom we consider similar to ourselves succeed at a certain task, it raises our own belief that we too can succeed at the same task (Bandura, 1977). The example of VEI used in this study is a written testimonial from a previous OL participant. The model–observer similarity hypothesis developed by Schunk and Hanson (1985) suggests that the effects of reading VEI rely on the perceived similarity between the model and the observer. Individuals observing a model whom they perceive to be similar to themselves will experience greater benefits to their SE when compared to observing a dissimilar model. This is due to the social comparisons that the observer makes with the model that he/she is presented with (Berger, 1977). Previous research has suggested that if observers consider themselves to be similar to the presented model, they may pay more attention to the model's actions and the consequences of these (Hooger-heide et al., 2016). High levels of model–observer similarity can increase the perceived relevance of testimonial information and thus increase the positive effect on the observer's task-specific SE (Bandura & Walters, 1963).

In order to increase and optimise the future use of OL by higher-learning providers, methods of providing the suggested 'student-centred' approaches need to be developed. The tailoring system used in this study presents a novel, previously unexplored approach to making an OL process more student-centred. The system used in this study tailors VEI to try and ensure high levels of model–observer similarity and thus increase its relevance and benefit for each learner. The benefit of tailored VEI is compared to that of generic information for online learners' SE to complete a set task within the OL. This study is relevant and necessary in the current educational environment, with results offering some indication of the feasibility of the student-centred approach used. If successful student-centred OL processes can be created, this opens the path for OL being openly available, accessible and beneficial to all learners, regardless of their learning characteristics.

2. Related work

This section presents the relevant previous research that has been conducted. This literature was considered while producing the hypotheses and designing the study itself.

2.1. Tailoring of communication

Tailoring is a method used to adapt information so that it is more relevant to each specific person on a case-by-case basis (Kreuter & Skinner, 2000). Information is adapted using an individual's characteristics, which are collected and assessed. Tailoring is a two-way process requiring a system to obtain information from the individual and then use this information to decide and choose the most appropriate material to feed back to the individual from among all the information available. Within written communication, tailoring attempts to mimic the natural customisation that an individual experiences during face-to-face communication (Webb et al., 2005).

Kreuter et al. (1999) state that the tailoring of communication requires four different components: data collection, a library of messages, decision-making rules and a form of message presentation. First, a method for collecting the required details about the individual is needed. These details could include their behavioural needs or background experiences. Second, there should be a database or library of potential information or messages that could be shown to an individual. A set of decision-making rules or algorithms are then required to choose the most relevant information to show the individual based on the personal details provided. Finally, a way of presenting this relevant information or feedback to the individual is needed.

The elaboration likelihood model developed by Petty and Cacioppo (1986) offers an understanding as to why tailoring information to an individual can lead to attitudinal or behavioural changes. It suggests that an individual is likely to process tailored information more thoughtfully if he/she finds it personally relevant to themselves, leading to higher chances of permanent behavioural changes (Petty & Cacioppo, 1986). According to the elaboration likelihood model, people are active information processors. When reading a message, individuals will consider it carefully, relating and comparing it to other information or experiences that they have encountered previously. Following the elaboration likelihood model, tailoring leads to the following process. Tailoring removes any unnecessary information, ensuring that the information presented is more personally relevant to the individual. This leads to the individuals paying more attention

to the information because they perceive it to be relevant to them. This increase in attention leads to more thoughtful consideration of the factors of the information, which could facilitate behavioural changes.

Hawkins et al. (2008) state four reasons why tailoring of communication is more likely to encourage behavioural change, more so when compared to generalised communication. The first is that tailored messages are more likely to catch the attention of readers and lead to them remembering the information. Second, tailored messages consider the readers' values and memories and create persuasive arguments based on these. Tailored messages can also be used to create emotional responses such as fear or hope. Negative emotions may lead to an individual paying more attention to the information. Finally, tailored communication can promote a comparison of an individual's actual and ideal behaviours, encouraging him/her to want to resolve any conflicts between the two.

2.2. Previous work in tailoring systems

A search of previous literature was unable to find any work that had looked into the use of tailoring of communication to improve either general or task-specific SE. However, a significant amount of previous studies that used tailoring to effectively encourage behavioural changes across a variety of contexts was found. This work was considered, as it was dealing with persuasive messages that were considered to be similar to the information that was going to be presented during the study.

Most previous research has studied the effect of tailored messages to encourage behavioural changes within the context of health and fitness. Studies looking into the use and feasibility of tailoring of communication within behavioural change interventions appear to use two different types of systems. The first system involves the use of a computer to obtain an individual's characteristics and tailor messages to these characteristics. Feedback is then provided in a printed form, such as a letter or leaflet. More recent interventions have studied tailoring systems in which the whole process is digitalised. Individuals share personal information that the system then uses to choose the most appropriate communication, which is then presented to the individual online.

Most of the intervention systems described in earlier studies contain the same three related elements outlined by Brug et al. (1999). First, an instrument is used to screen the individual with regard to the variables and personal characteristics based on which the communication and feedback will be tailored. These variables may vary between interventions, depending on the underlying theories of behavioural change that the system is based upon. Second, there is a source file where all of the possible messages that could be displayed are stored. Lastly, the systems contain a computer programme that uses logic to select the most suitable feedback for each individual based on the information they have provided.

These types of tailoring systems result in printed material with much more personalised information than generic mass-printed material aimed at the general population (Bull et al. 1999). Webb et al. (2005) suggest that this visible tailoring of materials increases the readers' attentiveness and memory of the information, which could possibly enhance their SE. This is because the information is perceived as more relevant and this can stimulate greater cognitive activity, increasing the chance of the material being effective in encouraging behavioural changes (Kreuter et al., 2003).

A common health behaviour that previous interventions have tried to change is smoking. Strecher et al. (1994) felt that smoking-related leaflets were lengthy and contained too much information that was irrelevant to some readers. In that study, the researchers compared the effect of receiving a tailored letter, a generic letter or no letter on participants' smoking behaviours. Letters were tailored based upon individuals' cigarette consumption, interest in quitting and the perceived benefits of quitting. The results showed that the amount of people quitting smoking was significantly higher in the group that received the tailored letter when compared to the generic letter-receiving group and the group that received no letter.

Dijkstra et al. (1998) also looked into changing smoking behaviours and compared the effect of two types of tailored letters, including outcome information and SE-enhancing information. Outcome information letters contained information on the positive effects of quitting smoking, such as its health benefits. The SE-enhancing letters contained information about the skills needed to cope with quitting an addiction. The results of this study found both types of tailored information to have a positive influence on the number of participants quitting after 7 days, when compared to a control group that received no letter.

Other studies have focused on individuals' nutritional behaviours. In a study conducted by Brug et al. (1998), computer-generated feedback letters were produced, which were tailored to individuals' dietary intake, attitudes and SE. These tailored letters were found to have a significantly greater impact on individuals' fat reduction efforts and fruit and vegetable intake when compared to the impact of generic letters.

A similar study focusing on nutritional behaviours was conducted by Kreuter et al. (1999). This study aimed to explore the mechanisms that lead to tailored information encouraging behavioural changes. In the study, participants received weight loss materials that were either individually tailored or generic. Researchers found that individuals who received the tailored materials had more positive thoughts about weight loss and felt more connected to the material than when it was generic. This led to positive self-assessments and positive thoughts, indicating the potential for behavioural change.

The results suggest that tailored material is more thoughtfully considered by the individual, and this process results in behavioural change; however, more work is needed in this area to better understand the mechanisms behind this.

Bull et al. (1999) compared the effectiveness of tailored, personalised and general health messages in encouraging healthy physical activity behaviour. These messages took the form of educational materials that were mailed to participants' homes. They found that individuals who received the tailored materials were more likely to increase their levels of daily physical activity when compared to other individuals who received personalised or generic health messages.

Some interventions have tried to encourage behavioural change across multiple health behaviours. Kreuter and Strecher (1996) incorporated tailoring into an individual's health risk assessments. The tailored health risk assessment took into consideration seven of the individuals' current health behaviours and provided them with printed behavioural change materials. Results showed that individuals who received the tailored health risk assessments were more likely to change at least one of the risk behaviours compared to individuals who received the generic assessments. Although the assessments were more likely to promote changes in the patterns of cholesterol screening, fat consumption and physical activity, it did not result in changes in terms of smoking, seat belt use, mammography and Pap smear behaviours.

De Vries et al. (2008) studied the effect of tailored feedback letters on an individual's smoking, physical activity and nutritional behaviours. During the study, participants received either three printed materials that were tailored to them using lifestyle information they provided or three print-ed generic materials. Results were similar to those found by Kreuter and Strecher (1996), with tailored information resulting in bigger improvements for physical activity and nutritional behaviours but not for smoking behaviours.

More recent studies have examined tailoring for technology-based communication. Previous work has suggested that online communication that does not take into consideration the behavioural and attitudinal factors of an individual can lead to negative health outcomes (Tinker, 1996). A tailored webpage was used by Bernhardt (2001) to help prevent skin cancer risk behaviours. Some participants were presented with a website that included information based on their current tanning behaviours, while others were presented with a website containing generic material. Results suggested that those who were presented with the tailored webpage gave the information more attention, resulting in them holding less-positive beliefs about tanning when compared to the individuals who read the generic website.

Strecher et al. (2005) focussed on smoking behaviours, in which some of the studies in the first category had struggled to encourage changes. Participants in this study took part in an online behavioural support programme to aid them in quitting smoking, which was either tailored to their current smoking behaviours or not. Results found that those who took part in the tailored support programme reported significantly higher abstinence rates than those who took part in the generic programme.

3. Research purpose and hypotheses

The use of a system to tailor communication based upon an individual's characteristics has previously been shown to work well in encouraging health and fitness behavioural changes. This study aims to investigate the feasibility of implementing a tailoring system into OL with the specific aim of presenting the most appropriate VEI to each individual based upon their personal characteristics. This tailoring is conducted within the context of career skills-based OL, and it is expected that this approach will promote increases to each individual's SE to complete a set task within the OL (referred to as task-specific SE in this study). The VEI that this study focusses on is that of a testimonial from a previous online learner who had successfully completed the set task that was presented. The aim of the tailoring system is to ensure high levels of actual model-observer similarity, which is suggested to increase the perceived relevance and benefit of testimonial information on an individual's efficacy beliefs (Schunk & Hanson, 1985). This increase in relevance should then lead to the testimonial information having a more positive influence on each learner's task-specific SE.

This study will test the effectiveness of tailoring testimonial information presented based upon an individual's career information provided at the beginning of the OL process and compare this against the use of generic testimonial information. This career information will include previous work experience, current career situation and future career goals. Career information was chosen as a similarity cue because of its relevance within career skills-based OL. This study will compare the interpretations and effects on task-specific SE of two types of testimonial information: a testimonial tailored to ensure high levels of career model-observer similarity and a generic testimonial. In this study, generic testimonial information refers to a testimonial where no career characteristics are presented about the model.

The tailoring system implemented within the OL for this study contains the four components outlined by Kreuter et al. (1999). A data collector at the beginning of the OL process asked the individual about his/her current career situation, past work experience and future career goals. There was a library of testimonials, from models varying in career goals and previous work experience. The system used logic to make decisions as to which single testimonial from the library had the highest level of actual model-observer similarity to the individual with regard to career information, based upon the data collected about the individual. The OL process then presented this testimonial to the participant at the most appropriate time, which – in this case – was just before the individuals were required to complete the task.

It is expected that high levels of actual model–observer similarity with regard to career characteristics will lead to the observers perceiving themselves as highly similar to the model. Previous work has suggested links between perceived model–observer similarity and perceived information relevance (Bandura, 1997). According to the elaboration likelihood model developed by Petty and Cacioppo (1986), this increased relevance will lead to the observer considering the information more carefully, increasing the likelihood of permanent behavioural changes with regard to task-specific SE. Based upon this process, the following three hypotheses are proposed:

- Hypothesis 1: Testimonial information tailored to ensure high levels of actual model–observer similarity with regard to career characteristics will lead to higher levels of perceived similarity when compared to reading generic testimonial information.
- Hypothesis 2: Testimonial information tailored to ensure high levels of actual model–observer similarity with regard to career characteristics will be perceived as more relevant when compared to generic testimonial information.
- Hypothesis 3: Testimonial information tailored to ensure high levels of actual model–observer similarity with regard to career characteristics will have more of a positive effect on an individual's task-specific SE when compared to generic testimonial information.

In this research, a clear distinction is made with regard to the differences between general SE and task-specific SE. General SE beliefs refer to an individual's self-belief that he/she is able to complete any set task at any time and is not specific, following the definition outlined by Bandura (1977). Task-specific SE beliefs in this study will only refer to an individual's self-belief that he/she is able to complete the set task presented within career skills-based OL. Previous work has found individuals with lower levels of general SE to interpret persuasive messages differently from others with higher general SE (Riet et al., 2008, 2010; Yang et al., 2016). This has been suggested to be because of the characteristics associated with individuals of differing general SE levels (Bandura, 1994). Because of this, it was felt important to consider the effect of an individual's starting level of general SE on the benefit of the tailored information provided. The fourth hypothesis proposed suggests that the tailoring of the VEI posed will ensure benefit to all learners' task-specific SE, regard-less of their general SE beliefs.

- Hypothesis 4: Testimonial information tailored to ensure high levels of actual model–observer similarity with regard to career characteristics will have a positive effect on an individual's task-specific SE regardless of that individual's general SE at the beginning of the OL process.

Overall, this study expects to find that using an individual's career characteristics to tailor testimonial information to ensure high levels of model–observer similarity will increase information relevance, resulting in bigger benefits to task-specific SE, when compared to using generic information. The benefit of the use of tailored VEI over generic VEI will be felt by learners regardless of their varying general SE beliefs.

4. Methods

In this section, the methodology used to conduct the study is outlined.

4.1. Participants

All the participants of this study were current university or college students. Participants were initially recruited using university mailing lists. Links to the OL study were also put on university blogs and newsletters. Amazon Mechanical Turk was also used to recruit other students, in which case, the participants received a small monetary reward for completion. A pre-vetting questionnaire ensured that all participants were native English speakers and genuinely wanting to improve their career skills at the time of completing the study. Ensuring interest in the OL material was important to make sure participants were completing it because they wanted to and no bias was introduced with the use of a monetary reward.

Thus, 92 participants took part in the OL; of these, 16 were omitted as they got the quiz question wrong during the online lesson. This left 76 participants whose data was analysed; the demographic details of these can be found in Table 1. Of those who provided demographic information, 53% of the population was male and 47% female. Participant's ages ranged from 18 years to 54 years (mean age = 27 years; SD = 7.32 years). Most participants had obtained some form of work experience previously (95%). The most popular career goal of the participants in the study was to find a graduate job (63%). Participants' pre-study general SE scale scores ranged from 17 to 40 ($M = 32$; $SD = 40$), showing a good variation in participants' general SE levels, which would be important when analysing data with respect to Hypothesis 4.

Table 1. Participant demographics.

Variables	Frequency	Percent
Gender		

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Male	40	53%
Female	36	47%
Age		
16 - 25	42	56%
26 - 35	24	32%
36 - 45	7	9%
46 - 55	2	3%
Career background		
Have work experience	72	95%
No work experience	4	5%
Career status		
To find an internship	2	3%
To get a graduate job	48	63%
To find a job alongside studies	26	34%

4.2. Research design and framework

A between-subjects randomised experimental design was used, allowing the control of the type of testimonial to which the participants were exposed. The independent variable in this study was the testimonial type the participant had been exposed to (either tailored or generic). Other variables in this study included perceived similarity to the model, perceived relevance of the testimonial information and perceived effect of the information on individuals' task-specific SE. All quantitative analyses were conducted in R package.

There were two study groups, each of which was presented with a different type of testimonial information. The tailored testimonial group received testimonial information from a model that had high actual similarity to the participants regarding career background, current career status and future career goals. The testimonial shown to the generic testimonial group mentioned nothing about the model's career characteristics at all. A full outline of the contents of each testimonial can be found in the *Information design* section.

For Hypothesis 1, the perceived similarity to the testimonial model presented within the tailored and generic testimonial groups was compared. The focus was upon three career-related similarity cues: career background, current career situation and future career goals. For Hypothesis 2, the perceived relevance of the testimonial information between the two testimonial groups was compared for significant differences. Effects of the testimonial information on each group's levels of task-specific SE were compared in analysis for Hypothesis 3.

In order to analyse the data for Hypothesis 4, two groupings were made depending on individuals' levels of general SE. Low and high general SE groups were created around the mean general SE score of the population, using the general SE scale proposed by Schwarzer et al. (1997). Those with a score equal to or above the mean ($M = 32$) were placed in the high general SE group, and the remaining participants were put in the low general SE group. Significance testing was conducted on the effects of the tailored testimonial to ensure that (a) it had a positive effect on the task-specific SE of those in both general SE groups and (b) that there were no significant differences in the effect it had on the task-specific SE of both general SE groups. If the tailored testimonial information was found to have a positive effect on the task-specific SE of both general SE groups and there are no significant differences between the effects on both groups, the results would support this hypothesis.

4.3. Information design

The study included two types of testimonial information: a tailored testimonial to ensure high levels of model–observer similarity with regard to career characteristics; and a generic testimonial.

The first type of testimonial presented to the tailored testimonial group was a fictional testimonial from a model with similar career details as the participant. Figure 1 outlines the possible six testimonials that could be presented to the tailored testimonial group during the study. The testimonial version presented was dependent upon each participant's previous work experience and future career goals, which were obtained at the beginning of the OL process in the pre-study questionnaire. So, for instance, if a participant indicated that he/she had some previous work experience and that

his/her goal was to find a graduate job, they would be presented with testimonial Version 6 (see Figure 2). The wordings of each of the testimonial versions was kept as similar as possible, with only phrases regarding the model's work experience and career goals differing between versions. As all the participants in the study were university students, the model presented in all the tailored testimonial versions was also a university student, ensuring high model–observer similarity regarding current career situation.

The generic testimonial was worded in the same way as the other testimonials, but any mention of career characteristics was removed. This testimonial included no information about the testimonial model's career background, current career status or future career goals (see Figure 3). In the case of the two testimonials created, their content was exactly the same. The models positively discuss how they felt about the task and then outline the steps they took to successfully complete it. The last sentence differed between the groups: 'Although the process was a challenge, I was successful and I will definitely be including the power statements I made today in my CV for when I'm...' This sentence would finish with the model's career goal, or in the case of the generic testimonial, it would not state any career goal. For those in the tailored testimonial group, they had additional information in the form of a brief description of the testimonial writer outlining his/her previous work experience, current career status and future career goal, placed above the testimonial.

The two testimonials were created bearing in mind the definition provided by De Wit et al. (2008). They outline how testimonial information is persuasive in nature and is usually presented in the form of a personal narrative. In the testimonials prepared for use during the interviews, the previous participant started by outlining his/her initial feelings about the task and then went on to de-scribe the steps that he/she took to successfully complete it. This was felt to follow the form of a personal narrative and fit the definition of a testimonial.



Fig 1. Tailored testimonial group: the testimonial versions.

The testimonial below is from a **university student** who has recently completed the set task. The student has **previous work experience**. Their career goal for the next year is to **find a job for when they graduate**:

'In the past, I haven't given much thought to the skills I had, which made it difficult for me to communicate my strengths when applying for jobs. During the process of completing the set task I was able to brainstorm all the skills I felt I had. I then followed the structure outlined in this online lesson to create a strong set of power statements. Although the process was a challenge, I was successful and I will definitely be including the power statements I made today in my CV for when I'm applying for graduate jobs in the future'

Fig. 2. Example of the testimonial presented to the high model–observer similarity testimonial group.

'In the past, I haven't given much thought to the skills I had, which made it difficult for me to communicate my strengths when applying for jobs. During the process of completing the set task I was able to brainstorm all the skills I felt I had. I then followed the structure outlined in this online lesson to create a strong set of power statements. Although the process was a challenge, I was successful and I will definitely be including the power statements I made today in my CV'

Fig 3. Testimonial presented to the generic testimonial group.

4.4. Design of the tailoring system

The system created to tailor the testimonial information presented to the tailored testimonial group contained all four components outlined by Kreuter et al. (1999). It had a data collector in the form of a pre-study questionnaire at the beginning of the OL process. This questionnaire contained two questions, the first of which asked participants to indicate whether they had any previous work experience. The answer to this question was binary, with students indicating that they either (a) had previous work experience or (b) had no previous work experience. Participants were also asked to indicate which of the following was closest to their career goal for the next year: (a) to find an industrial placement as part of their university course; (b) to find a full/part-time job to do alongside their studies; or (c) to find a graduate job. The system contained a library of six testimonials, details of which are displayed in Figure 1. Although the wording of all the testimonials was the same, career details of the testimonial model differed.

The system included a logic-based decision-making process (see Figure 4). Firstly, the library of testimonials was narrowed down by the fact of whether an individual had had work experience previously or not. The individual's future career goal was then used to choose the most appropriate testimonial, ensuring that actual similarity in career background and future goals was high. Once this testimonial was chosen, it was displayed back to the participant at the appropriate time, after the task was initially set.

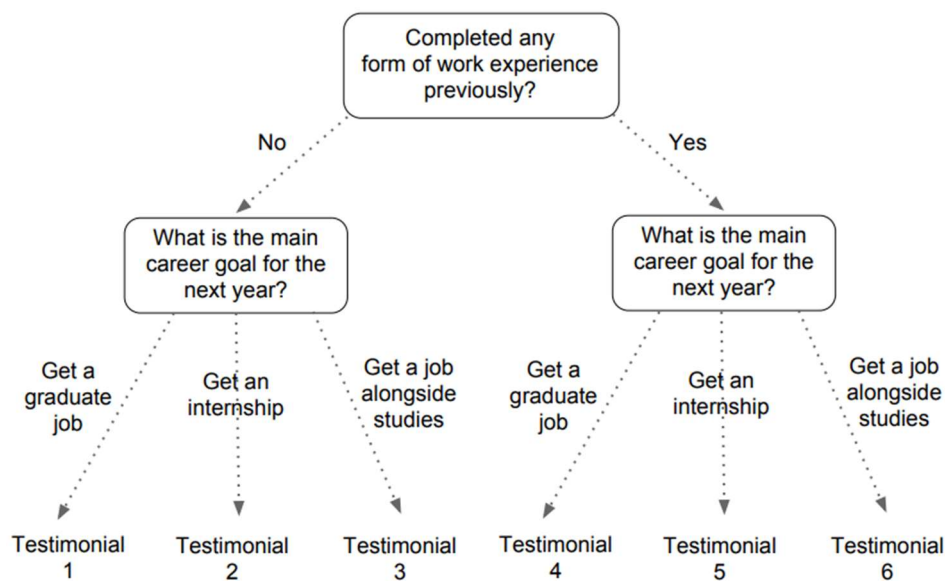


Fig 4. Diagram of the decision-making process.

4.5. Procedure

Data collection took place during May 2018. During the study, participants were required to complete an OL process, comprising educational slides to navigate through and then a task to complete utilising the skills outlined. The OL had a focus on identifying skills and communicating these within a CV effectively through the use of power statements. Before taking part in the study, participants were required to read an information sheet outlining what the study would involve before giving their consent to take part. Before beginning the OL process, participants completed the pre-study questionnaire. In this questionnaire, they provided information on their previous work experience and future career goals. Participants would then be randomly assigned to one of the two testimonial groups (tailored or generic) for the next stage

of the study. The only element of the OL process that differed between the two groups was the testimonial information they were shown.

The first section of the OL process included a slide presentation about the construction of power statements. This presentation was created especially for use within this study, although the information it presented had been collated together from career skill literature (Bright et al., 2015; Cottrell, 2015; Littleford et al., 2007; Mills et al. 2011). Straight after reading the material, participants were required to answer the question 'What was the most commonly looked for skill by employers?', by choosing to answer one of the following: (a) communication, (b) presentation or (c) teamwork. This was to check whether participants had participated and read the OL material, with the correct answer being (a). Any participants who did not get this question right were omitted from the data population as it was assumed they had not read the OL material in an appropriate manner.

After completing the quiz question, participants were set a task to complete (see Figure 5). The task was connected to the presentation material, and it asked them to create power statements to effectively communicate as many of their skills that they could identify. Straight after reading the task, the participants were asked to indicate their levels of task-specific SE. This question was phrased as follows: 'At this current moment in time, how would you rate your current self-belief in being able to complete the task that's been set?' This question was phrased using the definition of SE provided by Bandura (1994): 'Perceived self-efficacy is defined as people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives'. Participants indicated their answers on a five-point Likert scale ranging from '1' (Very Low) to '5' (Very High). After this, participants were presented with their group's version of testimonial information to read. After reading this information, participants were asked to fill out the information response questionnaire to gauge their initial perceptions of the testimonial information they read and its effect on their task-specific SE. Participants were then asked to complete the set task. Participants' answers were not considered during analysis, as they were not considered as relevant to the hypotheses posed.

The screenshot shows a task interface with the following text:

Now for your Task....

The task is to compose your very own Power Statements.

Here are some 'power words' that you could use, but feel free to also choose your own:

Creative
Motivated
Decisive
Resourceful

Write the rest of the power statements, remembering to use the **following structure** when writing them:

I am
+
For example ...
+
As a result

Try to prepare **at least 3 - 5 statements**. Some career experts recommend preparing a minimum 5 statements or more. The more power statements you can create the better you prepared will be, both in you CV and job interviews

Fig 5. The set task for participants within the online learning

4.6. Ethical considerations

Before carrying out the study, ethics approval was obtained from the relevant research ethics committee. Participants took part on their own accord and were made aware of their ability to leave the study at any time they wanted. During the study, participants were made aware that they could skip any questions that they did not feel comfortable about answering. Participants were required to give their consent to take part and any information they provided during the study remained anonymous and was treated with true confidentiality.

4.7. Data groupings and baseline measurements

Before analysis, two groupings were created, based upon the two different types of testimonial that were presented. These two groups were the tailored testimonial group ($N = 39$), including individuals shown a tailored testimonial to ensure high levels of model-observer similarity with regard to career characteristics, and the control group ($N = 37$), including individuals shown a generic testimonial.

To consider the effects of individuals' general SE and how they interpreted the types of testimonial information presented, low and high general SE groups were created. The data population was split into two halves, namely, the low and high general SE groups. Participants were sorted into their corresponding groups, depending on their pre-study general SE score. Those in the low group had a general SE score lower than the total population mean of 32 ($N = 36$). Participants in the high SE group had a general SE score of 32 or above ($N = 40$). Data was also split according to participants' general SE (low or high) and the testimonial type they were presented with (generic or tailored). A full outline of the groupings used in analysis and the numbers in each can be found in Table 2.

Table 2. Outline of groupings used in analysis and number of participants in each.

		Participant general SE		
		Low	High	Total
Testimonial type	Tailored	18	21	39
	Generic	18	19	37
	Total	36	40	

5. Results

Results are discussed in relation to each of the four hypothesis presented.

5.1. Perceived similarity to the testimonial model

This section of the analysis refers directly to Hypothesis 1, considering the relationship between actual model-observer similarity (tailored vs. non-tailored conditions) and perceived model-observer similarity. A two-way ANOVA was conducted to test the interaction effect of (a) a participants general SE and (b) testimonial type on perceived overall similarity to the model. A significant main effect was found between the perceived overall similarity to the model presented and the testimonial type shown, $F(1,72) = 25.9$; $p < 0.001$. Figure 6 presents a comparison of the mean perceived overall similarity between the two testimonial type groups. Those shown the tailored testimonial perceived themselves to be significantly more similar overall to the model presented ($M = 3.8$, $SD = 0.84$) than others shown the generic testimonial ($M = 2.8$, $SD = 0.99$), $t(73) = 4.89$, $p < 0.001$, $d = 1.09$. There was no main effect found between a participants general SE and perceived overall similarity to the model shown, $F(1,72) = 0.29$; $p = 0.59$.

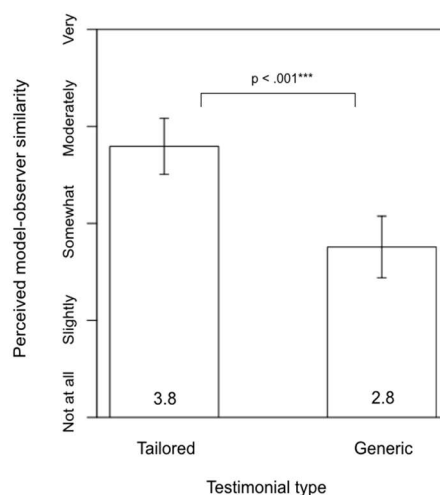


Fig 6. Comparison of the mean perceived similarity to the model between the two testimonial types.

The two-way ANOVA run also found a significant interaction effect of testimonial type and participants' general SE on the level of perceived overall similarity to the model, $F(1, 72) = 7.71$; $p = 0.007$. A series of two-sample t -tests found individuals with low and high general SE to report significantly different overall similarity levels to the model presented in the generic testimonial.

Figure 7 shows the differences in mean overall similarity, considering participants' general SE and the testimonial type that they were shown. Participants with high general SE felt they were significantly less similar overall to the model in the generic testimonial condition ($M = 2.4$, $SD = 0.96$) when compared to others with low general SE ($M = 3.1$, $SD = 0.83$): $t(35) = 2.34$; $p = 0.02$; $d = 0.78$. No significant differences were found in the perceived overall similarity to the model presented in the tailored testimonial condition between participants with low general SE ($M = 3.5$, $SD = 0.78$) and high general SE ($M = 4.0$, $SD = 0.95$): $t(37) = 1.6$; $p = 0.12$. Table 3 shows a comparison of the mean perceived overall similarity of the tailored and generic testimonial, considering participants' general SE group (low, high and combined).

Significance testing also found participants with high general SE to perceive their overall similarity to be significantly higher to the model in the tailored testimonial ($M = 4$, $SD = 0.95$) than the generic testimonial ($M = 2.4$, $SD = 0.96$): $t(37) = 5.22$; $p < 0.001$; $d = 1.67$. No significant difference was found in the similarity of those with low general SE towards the tailored in how similar those with low general towards the tailored ($M = 3.5$, $SD = 0.78$) or generic testimonial model ($M = 3.1$, $SD = 0.83$): $t(34) = 1.65$; $p = 0.11$.

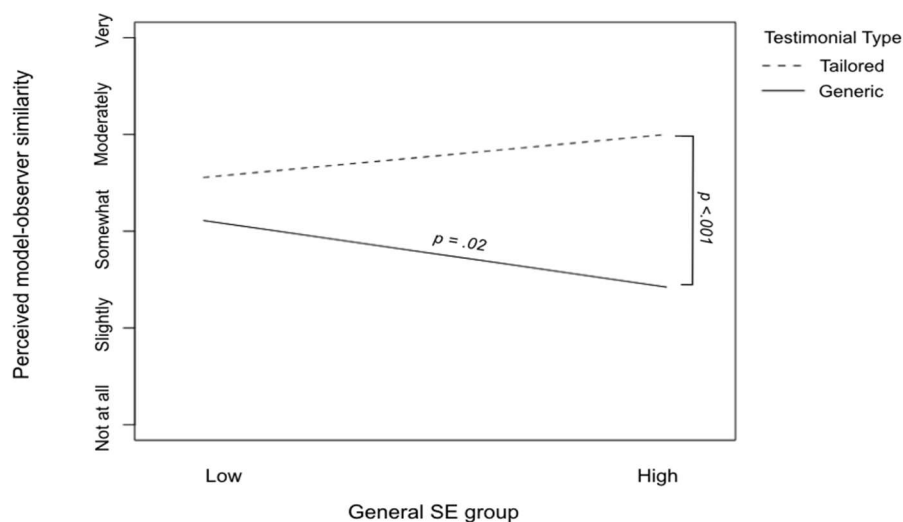


Fig 7. Comparison of mean similarity, considering participants' general SE and testimonial type shown.

Table 3. Comparison of mean perceived overall similarity: testimonial-type group versus participant general SE-level group.

		Participant general SE		
		Low	High	Total
Testimonial type	Tailored	3.3	4.0	3.7
	Generic	3.4	2.5	2.9

5.2. Perceived relevance of testimonial information

This section of the analysis refers directly to Hypothesis 2, considering the relationship between actual model–observer similarity and perceived relevance of the testimonial information presented. A two-way ANOVA was run to examine the interaction effect of testimonial type and participants' general SE on the level of perceived relevance of the presented testimonial information. No significant interaction effect was found: $F(1,72) = 2.24$; $p = 0.14$. There was also no main effect between participants' general SE and perceived information relevance: $F(1,72) = 0.19$; $p = 0.66$.

However, the two-way ANOVA did find a main effect on testimonial type presented and how relevant the participants found the testimonial information: $F(1,72) = 11.67$; $p = 0.001$. Figure 8 presents a comparison of the mean perceived relevance of the information between the two testimonial-type groups. A two-tailed t -test found significant differences in

the perceived relevance of the testimonial information presented between the generic and the tailored testimonial groups. Those in the tailored testimonial group perceived the testimonial information presented to be more relevant ($M = 4.0$, $SD = 0.84$) than participants in the generic testimonial group ($M = 3.3$, $SD = 0.99$): $t(74) = 3.41$; $p = 0.001$; $d = 0.76$.

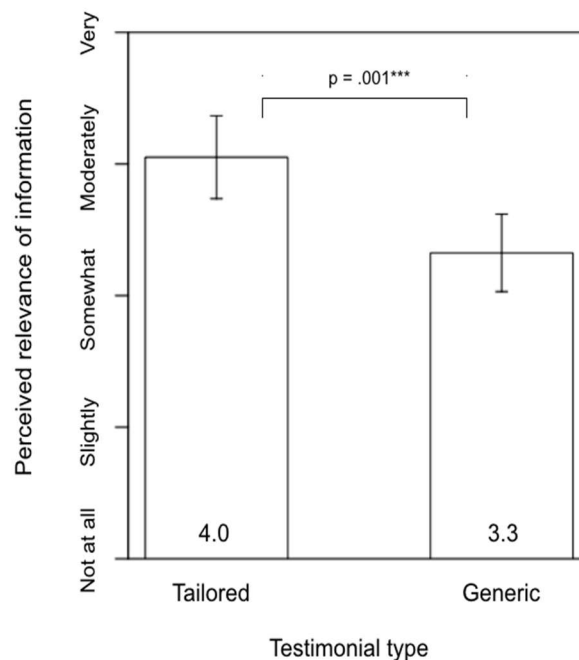


Fig 8. Comparison of the mean perceived information relevance between the two testimonial types.

5.3. Effect of testimonial information on task-specific self-efficacy

This section of the analysis refers directly to Hypothesis 3, considering the relationship between actual model-observer similarity and benefit to an individual's task-specific SE. This section also relates to Hypothesis 4, considering the effect of an individual's general SE on the benefit of tailored testimonial information on task-specific SE. A two-way ANOVA was run to examine the interaction effect of testimonial type and participants' general SE on the benefit of the presented testimonial information to participants task-specific SE. No significant interaction effect was found: $F(1,63) = 0.31$, $p = .58$. There was also no main effect found of an individual's general SE on how the testimonial information benefitted their task-specific SE: $F(1,63) = 1.7$; $p = 0.19$.

However, there was a significant main effect between the testimonial type presented and how participants felt the testimonial information affected their task-specific SE: $F(1,63) = 15.27$; $p < .001$. Figure 9 presents a comparison of the mean effect on participant task-specific SE between the two testimonial type groups. A two-tailed t -test found significant differences in the mean effects of the testimonial information on participant's task-specific SE between the generic and tailored testimonial groups. Those in the tailored testimonial group found the testimonial to effect their task-specific SE significantly more positively ($M = 3.8$, $SD = 0.38$) when compared to the mean effect on the task-specific SE of participants in the generic testimonial group ($M = 3.3$, $SD = 0.62$): $t(60) = 4.10$; $p < .001$, $d = 1.15$.

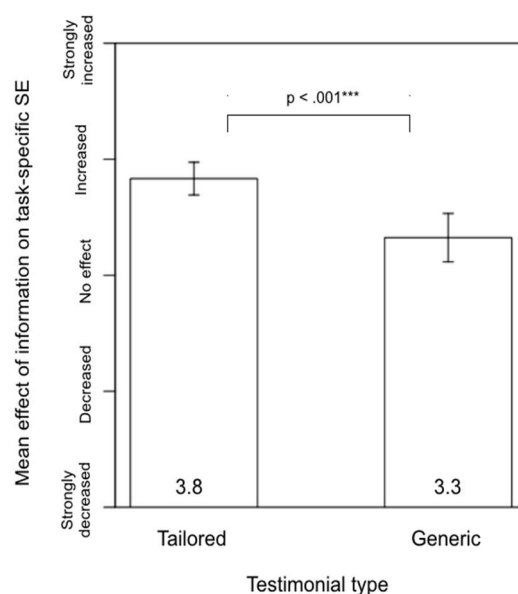


Fig 9. Comparison of the mean effect on participant's task-specific SE between the two testimonial types.

6. Discussion and conclusion

The results of this study lend some support to the feasibility of using tailoring to increase an individual's task-specific SE within career skills-based OL. A three-element tailoring system described by Brug et al. (1999) to encourage behavioural change in the form of increasing SE in being able to complete a set task was developed and implemented. This system was implemented in the context of OL and tailored based upon an individual's career-based information and characteristics.

A tailoring system that ensures that online learners are exposed to testimonials written by a model in a similar career situation as themselves ensures high levels of actual model–observer similarity, which was found to also lead to higher levels of perceived model–observer similarity. Higher levels of perceived model–observer similarity was found to lead to individuals finding the testimonial in–formation presented more personally relevant to them, which had a positive effect on their task-specific SE. The results are discussed from this point with reference to the earlier–posed hypotheses.

The results of this study partially support Hypothesis 1, suggesting that actual model–observer similarity in career characteristics did translate into perceived model–observer similarity. A two-way ANOVA found the testimonial type to have a main effect on the perceived overall similarity to the model. However, this main effect was primarily driven by the responses of participants with high general SE. High general SE participants were significantly more likely to perceive lower similarity to the generic testimonial and greater similarity to the tailored testimonial. In contrast, participants with low general SE did not perceive the model from the tailored testimonial as more similar when compared to the generic testimonial. This result suggests that tailoring the testimonial information shown based upon an individual's career situation to ensure high levels of model–observer similarity increases the levels of perceived model–observer similarity, but this is effective only for participants with high general SE. These results suggest that tailoring systems need to understand further how an individual's general SE interacts with perceived model–observer similarity.

In response to Hypothesis 2, a two-way ANOVA found testimonial type to have a main effect on perceived relevance of the testimonial information presented. The results support Hypothesis 2, with the use of a tailoring system to present testimonial information that ensured high levels of model–observer similarities leading to the information being perceived as more relevant when compared to the generic testimonial type. Kreuter and Wray (2003) suggest that visible tailoring of written materials can lead to higher levels of perceived relevance by the reader which stimulates greater cognitive activity. Despite participants with lower general SE not reporting greater perceived similarity to tailored testimonials (see Hypothesis 1 above), there was no interaction effect, and so both low and high general SE participants found tailored testimonials more relevant. This study supports previous work conducted by Kreuter and Wray (2003) within a new context of using a tailoring system to present testimonial material that ensures the highest levels of career-based model–observer similarity.

Results also support the process described in the elaboration likelihood model, which is used to understand why tailored materials are more effective in initiating behavioural changes (Petty & Cacioppo, 1986). In this process, it outlines how a tailoring system removes any unnecessary information, leaving information that is more personally relevant to the

individual. Results suggest that this was also the case within this context, as those in the tailored testimonial group perceived the testimonials to be significantly more relevant when compared to the generic testimonial group.

In relation to Hypothesis 3, the results of this study support the use of a tailoring system to increase the effect of testimonial information on an individual's task-specific SE during the OL process. A two-way ANOVA found testimonial type to have a main effect on the perceived benefit of the testimonial information on task-specific SE. As with the case for perceived relevance, there was no interaction effect with general SE, and thus, participants with both low and high general SE perceived the tailored testimonial to be more beneficial to their task-specific SE. Previous work had shown the effectiveness of tailoring in encouraging health behavioural changes (Bernhardt, 2001; Strecher et al., 2005; Webb et al., 2005). The current results support these previous studies within a new context of changing task-specific SE behaviours within OL. The results support Hypothesis 3 and find that a tailoring system used to ensure high levels of actual career-based model–observer similarity did result in the testimonial information presented having a significantly more positive effect on an individual's task-specific SE when compared to the effect of the generic testimonial presented.

Relating the results to Hypothesis 4, there was a main effect of testimonial type on perceived benefit, with the tailored testimonial being perceived as more beneficial to an individual's task-specific SE. Further to this, when conducting the two-way ANOVA, there was no significant main effect between participants' general SE and perceived benefit of the testimonial information on their task-specific SE. Combining these results support the hypothesis, showing no differences in the positive effects of the tailored testimonial type on individuals with low and high general SE. Earlier results outline the significant differences in the effect of the two testimonial types on an individual's task-specific SE. The tailored testimonial was found to have a significantly more positive effect on participants' task-specific SE when compared to the effect of the generic testimonial. Further to this, there was no difference in the positive effect that the tailored testimonial had on task-specific SE of those in the low and high general SE groups. These results suggest that tailoring testimonial information to ensure high model–observer similarity leads to benefits on the task-specific SE of all students, regardless of their general SE.

These results open up the possibility of future research looking into the effectiveness of using tailoring systems on other VEI types, such as video demonstrations. In addition to this, some OL happens through a series of lessons that make up an online course or module. Another thing to consider with multi-session OL is the possibility that the individual's task-specific SE varies on a daily basis, as previous research outlines SE as a non-static construct (Bandura, 1977). Future research could look into adapting the presentation of VEI to this natural fluctuation in task-specific SE and whether courses can be designed to provide SE boosts when they are needed.

Overall, results from this study support the use of a tailoring system to present testimonial information within career skills-based OL. Results show the feasibility of creating a tailoring system, containing the four components outlined by Kreuter et al. (1999) within career skills-based OL. By ensuring high levels of model–observer similarity with regard to career characteristics on a one-to-one basis, the testimonial information can provide a boost to task-specific SE, regardless of an individual's general SE.

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