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"I'd a set that back at the chocks":

The personal hypothetical "I would" in aviation flight instruction

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1. Introduction

Understanding interactional competence in pilot training is one way to increase instructor effectiveness. In this paper we explore how instructors use the personal hypothetical "I would" (IW) during flight instruction to teach students how to initiate actions, pay attention to and evaluate information, and make decisions. While traditional pilot training focused on technical skills, contemporary flight instruction considers the aviation system within the context of aeronautical decision making (ADM), which includes risk management, situation awareness, and resource management (FAA, 2008). ADM is "a systematic approach to the mental process used by aircraft pilots to consistently determine the best course of action in response to a given set of circumstances" (FAA, 2008, Chapter 8, p. 14). A key part of ADM, situation awareness is "the perception of the elements in the environment within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future" (Endsley, 1995, p. 36).

Teaching ADM and technical skills requires the flight instructor's role be multi-dimensional compared with a classroom instructor, as the instructor is simultaneously a teacher, a potential co-pilot, and a safety monitor.[1] Instructor actions are further complicated by the "learn by doing" approach: the student is flying the plane while the instructor is giving directions, instruction, advice, corrections, or even physical interventions as warranted (FAA, 2008). Teaching how to fly thus involves teaching how to make good decisions:

> A situation a student faces may not have one right or one wrong answer. Instead, a student encounters situations in training that may have several "good" outcomes and few "poor" ones. Rather than requiring the student to make a decision that matches the instructor's personal preference, he or she should understand in advance which outcomes are positive and/or negative and give the student the freedom to make both good and poor decisions. This does not mean that the student should be allowed to make an unsafe decision or commit an unsafe act. However, it does allow the student to make decisions that fit his or her experience level and result in positive outcomes. (FAA, 2008, Chapter 6, p. 10)

Melander and Sahlström (2009) showed that teaching technical flight procedures and situation awareness is a social rather than an individual phenomenon. These skills are taught and learned through interaction between the student and the instructor. The physical and temporal contexts the student's actions occur within and the events unfolding during the instructional

[1] See Björklund (2018), Deppermann (2018), De Stefani (2018) on the multi-dimensional character of driving instruction; as in aviation instruction, the driving instructor's roles are more complex than those teaching in classroom settings.

flight are inextricably linked to their actions. The interactional challenge for the instructor is how to teach technical skills while also encouraging and facilitating the student's developing ability to initiate actions, make decisions, and develop situation awareness—all key components of developing professional competence in this particular workplace context. Goodwin (1994) advances previous ethnomethodological and conversation analytic research in workplace studies by examining how situated action in professional contexts is an arena for the practice and teaching of professional vision defined as "socially organized ways of seeing and understanding events that are answerable to the distinctive interests of a particular social group" (Goodwin 1994, p. 606). In this article we show one interactional technique for accomplishing these diverse goals is a flight instructor's use of the personal hypothetical IW.

Hypothetical constructions can be accomplished through the use of a modal verb such as "would" (Koester & Handford, 2018). While other studies have investigated the use of hypothetical speech in a range of contexts (e.g., Koester & Hanford, 2018), its use has not yet been examined in flight instruction. In addition to its use as a hypothetical, "would" can be used as a marker of tentativeness or politeness (Ronan, 2011) or as a mitigating device (Linde, 1988). Ronan (2011) notes that "would is used as a hedging device in expressions, particularly to decrease the assertiveness of comments by power-holders in some situations, or as a face saving strategy in others" (p. 166). Farr and O'Keeffe (2002) found that teachers may use the modal verb "would" as a hedging device to minimize the impact of their power relative to the student.

We first briefly review previous literature on interactional processes in teaching, and then describe the data and methods of analysis used. The body of the paper presents our analysis of how instructors use IW in their interactions with students during instructional flights. We describe the types of actions instructors perform with IW formulations, and how they enable

instructors to accomplish the many tasks required by their overlapping roles to help students develop technical skills, ADM, and professional competence. In the concluding section we discuss how the use of hypothetical formulations such as IW can help instructors perform standard pedagogical tasks such as teaching specific skills, directing attention, giving advice, and correcting errors while displaying an orientation to the autonomy of the student, projecting the discretionary nature of particular actions, mitigating directives, and serving as expert role models.

2. Previous research on interactional practices relevant for teaching

Previous research on pedagogical practices in a variety of educational settings has addressed the role of interactional competence and the pragmatics of communication in doing the work of educating (e.g., Arminen, 2017; De Stefani, 2018; Ishino, 2018; McHoul, 1990; Willemsen, et al., 2018). Types of instructional actions commonly performed by teachers are directives, advice-giving or suggestion-making, and error-correcting or remedy-providing.

2.1. Directives

As Goodwin (1980) notes, directives can be formulated as imperatives or can be formulated indirectly using a variety of techniques. Goodwin and Cekaite (2013) define directives as "utterances designed to get someone to do something" (see also Goodwin, 1990). Directives (especially imperatives—Vine, 2009) can be a way of exerting dominance or control over another (Goodwin, 2002). Directives are often mitigated (Goodwin & Cekaite, 2013). In Goodwin's (2002) analysis of directives in children's interactions, she found that unmitigated directives assert power differentials between participants. Vine (2009) found that how directives were formulated varied with the context in which they occurred and was related to social role

and social status in the organizational setting she investigated, as well as to the purpose of the exchange. Fischer and Orasanu's (1999) study of airline pilots found that copilots tended to use hints to point out problems, whereas captains would issue commands. They attributed this difference to the power and status associated with rank.

2.2. Advice-giving

Advice-giving can be problematic interactionally in both ordinary conversation and in institutional talk (Hutchby, 1995; Jefferson & Lee, 1992; Kinnell & Maynard, 1996; Sandlund, 2014). In instructional contexts, a wide range of interactional techniques are used to accomplish advice-giving. Park (2018, p. 2) notes that advice-giving

> is an accountable event (Bolden and Robinson, 2011) and a delicate activity that invokes epistemic asymmetry between the participants and the normative course of action to be taken (Heritage and Sefi, 1992). The successful delivery of advice that minimizes resistance from the recipient involves much interactional work, even when advice-giving constitutes the central activity of the interaction based on the participants' explicit orientation to their epistemic asymmetry (Butler et al., 2010; Sandlund, 2014; Waring, 2007).

How advice-giving is done varies depending on the interactional context and the goals of the interaction. For example, Heritage and Sefi (1992) found that mothers of newborns were often resistant to being given advice by visiting nurses. The nurses therefore incorporated advice-giving into the interaction in ways that would be less challenging to the recipient. Park's (2018) study of how writing teachers give advice to students showed reported thoughts were a key device for getting criticisms of the work on the table. Garcia's (2012) study of advice-giving in mediation sessions found mediators use a range of interactional techniques to give advice

without challenging disputant autonomy and mediator neutrality. Melander and Sahlström (2009) showed how instructors shifted from "you" to "we" when delivering a critique, thereby framing the advice as a shared experience of persons and aircraft rather than solely owned by the student.

2.3. Error-correction and remedies

As in pedagogical interactions in other contexts, the flight instructor often corrects the student through talk and action. Kääntä (2014, p. 90) found that correction

> as it occurs in the institutional and instructional interaction of classrooms, is seen to differ from the everyday notion of repair (Schegloff et al., 1977) that deals with problems of hearing, speaking and understanding ongoing talk.

However, certain formats, techniques, and operations used by conversational repair are also at play in pedagogical and sociotechnical correction sequences (Arminen, 2017; Arminen, Auvinen, & Palukka, 2010; Weeks, 1996). McHoul (1990) found that classroom teachers use other-initiation of repair to elicit student corrections, and also used less-than-direct methods of initiating repair such as giving clues to guide the student in discovering the correct answer. Direct other-corrections do occur in pedagogical contexts as well (Lopez-Ozieblo, 2018; Seedhouse, 1997; 2004). Depperman's (2018) study of German driving instruction investigated the use of unmitigated imperatives to correct student errors. Direct techniques for drawing attention to errors and teaching through corrections and explanations are also used in pilot training and other instructional contexts (Levin, et al., 2017). Studies of crew interactions in airplane cockpits and with air traffic control (ATC) show how interactional repair mechanisms can be used to correct or preempt troubles (Arminen & Auvinen, 2013; Arminen, Auvinen, & Palukka, 2010).

Collectively directives, advice-giving, correction, and repair are interactional practices that may serve to "fine-tune" the student's attention appropriate to the workplace environment (de León, 2017, p. 48). In the next section we describe the data and analytic approach used in this investigation of how instructors use the personal hypothetical IW to perform these interactional practices during flight instruction.

3. Data and methods

3.1. Data collection and preparation

The data for this study were drawn from a collection of over 100 hours of recordings of instructional flights (Tuccio and Nevile, 2017). This collection included video recordings of one student's entire primary (private) and instrument pilot instruction spanning four different instructors, and over 30 flights and audio-only recordings from four different instructors (including 31 hours from the first author as instructor) and ten different students (1 female). Some of these were previously existing recordings collected for other (non-research) purposes. In these cases, the participants signed consent forms after the fact.[2] For the remainder of the recordings, participants were informed about the research project prior to the flights (see Tuccio and Nevile (2017) for more information about the data collection process). Instructors and students were briefed that the recordings would be used in research related to instructional flights and to improve instructor effectiveness and radio communications. All participants signed consent forms allowing the recordings to be used for research purposes. For the excerpts used in this paper, all participants permitted the use of the data without anonymization. No funding was

[2] The first author was the instructor in Excerpts 1 and 4; both these excerpts pre-dated the research and were initially collected for non-research purposes.

received to develop the corpus and the corpus is not associated with any institution or organization.

The students' stages of training ranged from primary through advanced. All talk was in English, with only 2 of the 10 students having English as their second language. All instruction was conducted in single-engine airplanes (no simulators). Figure 1 shows the actual airplane training environment with the student seated on the left and the instructor on the right. Both wear headsets to communicate with each other and on the radio. Both instructor and student have a full set of controls allowing immediate preemption by the instructor if necessary.

INSERT FIGURE 1 HERE

The first author produced rough transcripts of about 90% of the collection (see Tuccio and Nevile, 2017). The transcripts were searched electronically for the word "would" and the contraction "I'd." The remaining 10 percent of the recordings were screened aurally for the phenomena of interest. This process resulted in 322 instances of "would" or "I'd" in the collection. Of these, the first author found that 96 of these were instructor uses of IW, of which about 50 were instances where IW was used as a personal hypothetical (a distinction we expand upon later). These 50 instances plus several non-personal hypothetical uses of IW were transcribed in detail using the conventions of conversation analysis (Jefferson, 1984; 2004).

In the transcript excerpts participants are indicated with an abbreviation followed by a number to distinguish between different students (e.g., STU1, STU2) and instructors (e.g., INS1, INS2). Radio transmissions from the control tower are indicated by "TWR". The online supplement includes the recordings of each of the excerpts discussed in the paper.

3.2. Methods of analysis

In this paper we utilize the conversation analytic approach to the analysis of interactional data (e.g., Arminen, 2017; Garcia, 2013; Heritage and Clayman, 2010, Hutchby and Wooffitt, 2008; Liddicoat, 2007, Schegloff, 2007, Sidnell, 2010; ten Have, 2007). Conversation analytic studies examine talk in its interactional context in order to discover the procedures used to construct actions and interpret the actions of others. A conversation-analytic approach was used to investigate how instructors used the personal hypothetical IW in these instructional flights by analyzing their use in the sequential context in which they are used (e.g., Heritage and Clayman, 2010; Schegloff, 1992). Conversation analytic studies have been used to examine talk in a variety of institutional settings, including studies of talk in airplane cockpits and with ATC (e.g., Arminen et al., 2010; Garcia, 2016; Nevile, 2004a; 2004b; 2006). We analyzed instructor's use of IW in the contexts they occurred within to discover how the IW formulation works to frame the action and display the instructor's orientation to it. In the analysis sections that follow we show how instructors use the personal hypothetical IW to perform such actions as framing directives as advice or suggestions rather than commands, presenting options as professional decisions rather than as mechanistic responses, highlighting phenomena, or providing a first person exemplar of how to do something rather than stating a procedure.

4. Data analysis

In this section we analyze how instructors respond to student's actions in the context of inflight instruction. In order to make the work done by IW visible, we begin with an example of an instructional exchange which did not involve IW. We then show how IW can be used to

mitigate directives or instructions given to students. Next, we show how instructors can formulate their responses to student actions or questions using the personal hypothetical IW in a variety of contexts. We show how the personal hypothetical IW can be used prospectively or retrospectively—in instructor guidance in advance of student actions, during actions-in-progress, and after student actions or errors had been completed or corrected. Instructors also used personal hypothetical IW formulations when providing general information which was not grounded in ongoing action (i.e., a future hypothetical action). We begin with the analysis of an example of an instructor response which does not involve the use of IW.

4.1. Instructor responses without IW: Time-sensitivity and severity of context

IW-mitigated directives or personal hypothetical IW formulations were not used in all instructor responses to students' actions in these data. In fact, instructors routinely formulated responses to student actions without using hypothetical formulations or IW. In particular, situations which the instructor judged were time sensitive and/or urgent, particularly when there were safety concerns, were handled more directly. For example, in Excerpt 1 the student is about to land the plane and is having trouble.

Excerpt 1: Instructor response in temporally constrained situation (Audio only)

```
01  INS1:  the no:se is comin' up↑. (0.4) the airspeed's goin' down↓. (0.3)
02         and we're like fla:ring: at three hundred feet.
03         (1.0)
04  INS1:  you want me to take it? or you gonna f[ix it?]
05  STU1:                                        [   I: ]- I got it
06  STU1:  I got [it ]
07  INS1:        [the] airspeed's dangerously low.
```

```
08         (0.3)
09  INS1:  my flight controls
10         (.)
11  STU1:  'kay
12         (4.0)
13  STU1:  okay
14         (0.3)
15  INS1:  I'll take it.
16         (0.3)
17  STU1:  [okay:
18         [((stall warning))
```

The student has misjudged his height above the ground and is about to 'land' 300 feet above the ground—a dangerous situation. The instructor's announcements in lines 1 and 2 explicitly highlight the problem for the student. After allowing a pause for the student to respond verbally or to begin to engage in corrective action (line 3), the instructor corrects for the student's lack of immediate response by asking "you want me to take it? or you gonna f[ix it?]" (line 4). In spite of the urgency and time-sensitive nature of the situation, the instructor initially displayed an orientation to the student's autonomy by providing him the option of taking corrective action (first implicitly, through his announcement of the problems, and second explicitly, through his question).

The student's response to the instructor's question displays an orientation to the time-sensitive nature of the question by overlapping it. In his answer he declines the instructor's offer of help by indicating that he will continue flying the plane ("[I:]- I got it I got [it]"; lines 5 and 6). The instructor's next utterance also overlaps its prior, and upgrades the severity of the problem by reformulating his former announcement "the airspeed's goin' down↓." (line 1) to the

upgraded announcement "[the] airspeed's dangerously low." (line 7). After a brief pause (line 8) the instructor uses the FAA prescribed scripted phrase "my flight controls" (line 9) to unambiguously take control of the aircraft from the student. This scripted phrase is expressly designed to prevent confusion as to who is flying the plane.[3] By the end of the excerpt, the aircraft stall warning has activated (line 18), indicating the aircraft's airspeed did in fact become dangerously slow.

Even in this devolving situation, the instructor displays an orientation to the student's autonomy by using announcements and questioning formulations instead of directives or commands (as discussed, in lines 1, 2, 4 and 7). However, when temporal constraints on maintaining safety during flight occurred, the instructor prioritized his role in ensuring safety over his role in promoting student learning and autonomy. He took control of the aircraft from the student rather than continuing to guide the student thus utilizing his professional vision (Goodwin, 1994) of the temporally constrained situation and transitioned from teaching to maintaining safety of flight. In the next section we discuss the use of IW formulations to mitigate a directive or command.

4.2. Non-hypothetical IW formulations used as a mitigation technique in flight instruction

As Excerpt 1 has shown, when a time-sensitive action is required, especially in a potentially dangerous situation, the instructor did not use the IW formulation, and instead used an unmitigated directive. When the situation is less time-sensitive and less urgent, instructors in

[3] The full scripting prescribed by the FAA is the non-flying pilot stating, "my flight controls", with a confirmation by the flying pilot, "your flight controls", and the newly flying pilot confirming, "my flight controls.". The student's responses ";kay" and "okay" (lines 11, 13) do not conform to standard verbiage. The instructor speaks again in line 15 ("I'll take it."), thus repairing any ambiguity as to who is flying the plane.

these data use a range of techniques to respond to or direct student actions, including the use of IW to mitigate a command or directive, for example by framing it as a request.

In Excerpt 2 an instructor frames an utterance with IW, which works to mitigate a directive. This excerpt occurs as the student is practicing a precision type of landing known as a "short field landing," whereby the student must touch down within a prescribed distance of an agreed upon spot on the runway.

Excerpt 2: IW to mitigate a directive (Audio only)

```
01    INS2: okay::, so:, (1.0) on this approach (.) short field landing
02    STU2: okay.
03    INS2: (got u:h) (1.0) (and) so let's pretend the runway begins right
04          where runway two seven is, that's the second [str:ipe        ]
05    STU2:                                              [(    )crossover]
06          yep.
07    INS2: past the piano keys.
            (0.2)
08    STU2: okay.
            (0.2)
09->  INS2: I'd like you to touchdown on that second stripe?,
```

In line 1 the instructor informs the student that he should do a short-field landing. The student acknowledges this announcement ("okay."; line 2). In lines 3, 4 and 7, the instructor teaches professional vision as he disambiguates where the target touchdown point will be by using the descriptors "runway two seven", "the second stripe", and "piano keys." By defining the criteria for the landing, the instructor is elaborating on the details of the task he introduced in line 1, and doing so in a way that helps the student "see" the touchdown point. The student agrees

with the instructor's touchdown point in lines 5-6 and 8. In line 9, the instructor produces a directive ("touch down on that second stripe?,"). This utterance is formulated as a polite request rather than as a command through the IW formulation followed by like ("I'd like you to..."), which work together to mitigate the directive.

In sum, in this excerpt IW helps to mitigate the command/directive without a personal hypothetical component. In the remaining sections we discuss those instances in which the instructor uses IW to accomplish a shift to a personal hypothetical frame. We show how instructors formulate utterances with the personal hypothetical IW by performing such actions as correcting a student's errors, providing instruction, giving advice, or making particular phenomena salient.

4.3. Personal hypothetical IW use

In the collection from which our data were drawn, instructors' use of IW was not common, but when it was used it appeared in a range of contexts relative to student's actions during the ongoing work of learning while flying the plane. In the remaining sections we analyze four different occasions of use of the personal hypothetical IW.

Personal hypothetical IW formulations were used prospectively and retrospectively relative to student actions in these instructional exchanges. In these cases, instead of instructing the *student what to do*, the instructor describes what *he would do* in that situation. Instructors also used IW formulations when providing general information which was not grounded in ongoing action (e.g., a future hypothetical action). We show how instructors may formulate utterances with the personal hypothetical IW when performing actions such as providing instruction or directives, giving advice, or correcting a student's errors. The personal

hypothetical IW enables instructors to use their own experiences, knowledge, and perspectives to teach a wide range of skills and to provide information, highlight phenomena (including attention to visual phenomena), model ADM, and facilitate the student's development of autonomy.

4.3.1. Personal hypothetical IW in advance of student actions

In situations where there is not a time-critical safety hazard, the instructors in these data at times used IW to create a personal hypothetical response to students' actions which worked to guide, prompt, instruct, or advise students' next actions. The use of the personal hypothetical IW enables the instructor to present these actions as his own professional discretion, rather than directing the student what to do next.

In Excerpt 3 an instructor uses a personal hypothetical IW prior to a student's action. The student in this excerpt is wearing special glasses ("foggles") that restrict his view to inside the cockpit, while the instructor can see inside and out. The purpose of these glasses is to teach the student how to fly the plane during times when outside visibility is obscured by clouds, rain, etc. (known as flying solely by reference to instruments).

Prior to the excerpt, the instructor and the student discussed a plan to exit the holding pattern on a particular course (the "zero seven five" referenced in line 11 of the transcript). As the excerpt begins, the student is flying the inbound leg of the holding pattern. The excerpt shows the work the instructor does to assist and guide the student toward accomplishing this maneuver.

The "it" referred to in lines 2, 5, 13, 16, and 18 is the geographical navigation radio station they are passing. The DME referred to in lines 12 and 15 is an instrument which indicates distance from the geographical navigation point where the turn will happen.

Excerpt 3: Personal hypothetical "I would" prior to student action (Video)

```
01    INS3: ((INS3 looking at his window and down)) Well (0.4) I mean
02          you're- yeah you could spit and hit it from here so don't
03          chase the needle, you're comin' up on the cone, so just hold it
04          (0.8)
05    INS3: fly out the other side of it (0.4) ((clears throat))
06          (2.2) ((STU3 looks at notes in lap))
07    STU3: okay
08          (0.3)
09 -> INS3: I would a::h: ((looking at instrument panel))
10          (3.5)
11    INS3: probab[ly think] about turning towards zero seven five! as
12    STU3:       [(what)  ] ((STU3 points at DME))
13    INS3: you get up over'd it
14          (.)
15    STU3: all right ((STU3 points at DME))=
16    INS3:                                 =top of it
17          (.)
18    STU3: we are. we're passing over it now ((STU3 touches DME)) looks like
19          (0.3)
20    INS3: yep
```

As Excerpt 3 begins, the instructor is helping the student to avoid an error in his action-in-progress. The instructor provides a range of different types of directions and feedback, similar to what Weeks (1996) calls "in-course guidance" (p. 259). The instructor first informs the student what he sees out the window about the location of the navigation radio station (lines 1-

3).[4] He then produces directives, first telling the student what *not* to do ("don't chase the needle," lines 2-3), and then telling him what to do ("so just hold it", line 3; and "fly out the other side of it", line 5). These instructions are forms of guidance and assistance and are given directly without mitigation.

However, in line 9 the instructor takes another approach to his in-course guidance. He uses the personal hypothetical IW to frame advice about what to do in the immediate future as a suggestion rather than as a directive ("I would a::h: ((looking at instrument panel)) (3.5) probab[ly think] about turning towards zero seven five! as you get up over'd it"; lines 9, 11, 13). By providing the advice or suggestion as what *he would do*, he both guides the student as to what type of action should be done next and also conveys the discretionary nature of the timing of the action. By using an uncertainty marker ("probably think"; line 11) the instructor marks the tentative nature of this suggestion. In addition, he conveys the advice as teaching a process (what the student should probably think about at that point—as he approaches "it"—the navigation radio station).

The student displays his receipt of the instructor's advice both verbally and nonverbally in this excerpt. First, as the instructor says "turning" in line 11, the student points at the DME with his finger (line 12). After the instructor has completed his suggestion, the student responds verbally with "all right" while again pointing at the DME instrument (line 15). In line 18 the student confirms that his examination of the instruments shows that they are now flying "over it" ("we're passing over it now ((STU3 touches DME))"; line 18). The student thereby displays his developing professional vision—being able to "translate" the numbers on the DME instrument to the visual image of the plane passing over the navigation radio station they are passing. This

[4] As a general rule, in this situation the instructor should avoid informing the student what is outside the plane, as it can cause confusion with the student's restricted field of vision which consists of only the flight instruments.

professional vision is displayed through words and gestures in line 18. Note that the student ends with “looks like”, thus conveying that he has transformed the numerical information to a visualization of the plane’s position (in aviation terms, a “mental model”). Through these actions the student displays his understanding that it is now time to turn. This understanding is based on the advice and guidance he has received from the instructor in combination with his observations of information obtained from the DME. As noted, this process involves using visual information provided by the instructor which is unavailable to the student (the instructor can see the geographical navigation aid out the window; the student cannot due to the foggles) as well as the student’s interpretation of the aircraft instruments.

The instructor’s use of the personal hypothetical formulation in line 9 differs from the directives he produced in earlier turns (lines 2-3 and 5) in several ways. First, the use of the first person hypothetical IW functions as a mitigated directive as to what to do next by showing what *he would do* rather than telling the student *what to do*. In essence, the instructor conveys that he would use passing over “it” as a prompt to start his turn. This lesson therefore combines learning how to “see” with the instruments—translating the numbers to a mental model of where the plane is—with learning how to attend to the turn decision. The instructor thereby acts as an expert role model which the student may choose whether to follow. By describing what he would “probably think about” when he got “up over’d it”, the instructor encourages noticing and situation awareness of an unfolding event, promoting the elements necessary for ADM—“highlighting” (Goodwin, 1994, p. 606) and an “education of attention” (de León, 2017, p. 48)—thus building professional vision in the student. Third, this formulation puts the onus on the student to make the ultimate decision of when to act, thus promoting autonomy and professional competence.

4.3.2. Personal hypothetical IW with actions-in-progress

In Excerpt 4 an instructor uses a personal hypothetical IW while advising a student regarding an action-in-progress. The student is learning to fly an Instrument Landing System approach. The aircraft's heading (direction of travel) is the trouble source in this excerpt.

Excerpt 4: Personal hypothetical IW during student action (Audio only)

```
01    INS1: so you see where Walox is? we're no where close >to it<-
02          we're still gonna be inside of it, if you look at the picture?,
03          (0.3)
04    INS1: you hate to use the picture but you gotta:↑ okay?
05          (3.5)
06    STU4: so go more left?
07          (0.5)
08 -> INS1: I would!, yeah, cause you'd like to get that localizer as
09          early as possible. even if you hit this at a ninety (0.5)
10          y-y that's kind of far but
11          (1.0)
12    STU4: So two=
13    INS1:       =like there two sixty I think=
14    STU4:                                    =two sixty okay.
15          (0.5)
16    STU4: I was gonna do two fifty.
17    INS1: alright two fif-(.) ty- (.) if you can make a decision I like it
18    STU4: okay.
```

Prior to the beginning of Excerpt 4, the instructor attempted to guide the student through various steps of the instrument approach procedure. As the excerpt begins, the instructor is working to help the student correct a navigational problem by deciding upon the proper heading to fly (lines 1-2). "Walox" is a navigation point that is part of the instrument approach procedure. The instructor directs the student's attention to the location of Walox ("see where Walox is?"; line 1) and to "use the picture" (line 4).[5] Note that the instructor is working to get the student to discover the solution himself by looking at "the picture", rather than simply directing or telling the student how to change the direction of the plane (the heading). After a 3.5 second silence (line 5), the student offers a candidate solution ("so go more left?"; line 6). The student's utterance begins with "so", an upshot/transition marker (Bolden, 2009; Heritage & Watson, 1979) which works to display that his proposed solution is in response to the instructor's prior directions. The student's use of questioning intonation ("left?") marks his proposed solution as tentative and requests confirmation from the instructor.

The student's question in line 6 is formulated with a preference for a "yes" answer (Sacks, 1987). However, even though the instructor provides the preferred response, his turn in line 8 does not begin with "yes." Instead, he begins with a personal hypothetical "I would!", and then answers the student's question ("yeah,"). Through this IW the instructor expresses agreement with the student's proposed solution, while at the same time the use of the personal hypothetical frame conveys the degree of the turn is a matter of professional discretion. In addition, the instructor's stress on the word "I" in line 8 works to emphasize that this is what *he would* do, not necessarily what the student or another pilot might decide to do. The instructor

[5] The first author was "INS1" in this excerpt. His phrase "hate to use the picture" refers to a pilot situation awareness skill—the ability to visualize where a plane is in space without looking at a moving map and instead by using other legacy indicators such as needles, time, and numerical information.

then produces an explanation of why he would ("I would!") turn further left (lines 8-10). As in Excerpt 3, the instructor's use of the personal hypothetical IW serves to fine-tune the student's attention necessary to achieve situation awareness and accomplish ADM.

After a pause, the student begins an utterance which subsequent actions (to be discussed shortly) confirm initiates a proposal for a specific heading in response to the instructor's explanation of why he (the instructor) would "go more left". However, the student drops out when the instructor begins speaking (line 13). The instructor's suggestion of a heading of "two sixty" is not produced as a definitive recommendation. He hedges his suggestion with "like there" and the uncertainty marker "I think", thus displaying an orientation to a heading of two sixty as a possible solution to the problem rather than a definitive recommendation or directive. The student displays receipt of this recommendation by immediately repeating it ("two sixty"' line 14), followed by a confirmation and acceptance of the instructor's proposed heading ("okay."; line 14).

However, after a pause, the student then discloses that he had reached a different conclusion as to what heading to use: "I was gonna do two fifty." (line 16). Perhaps the student's turn beginning in line 12 would have been completed as 250, and he only "agreed" to 260 when the instructor interrupted and suggested it. This potential disjuncture between their positions (Clayman, 1985) is quickly resolved by the instructor in line 17. The instructor not only defers to the student's proposed solution ("alright two fif- (.) ty-"; line 17), but compliments the student for coming up with a solution on his own ("if you can make a decision I like it"; line 17).

In sum, this excerpt shows how an instructor can follow FAA (2008) guidance to maximize opportunities for student autonomy and independent decision-making. The use of the personal hypothetical IW was a key component of how this was accomplished in this instance.

By using the personal hypothetical IW to frame his suggestion, the instructor frames the choice of heading as professional decision rather than as a right or wrong answer, and makes clear that what he was teaching was the *process* of finding an answer to the problem, not the answer itself. The instructor thereby facilitates the student's exercise of initiative as he progresses towards becoming a pilot capable of independent decision making. By displaying how *he would* do the work of deciding what to do when flying a plane, the instructor supports the student's development of autonomous decision-making. At the same time, the instructor's IW formulation helps the student connect his decision-making process to his developing professional vision, and learn to use his visualizations as cues for the timing of these decisions.

4.3.3. Personal hypothetical IW after a student action or error

We found that instructors in these data may use the personal hypothetical IW when providing instruction, advice, or explanations after a student action has been completed or an error has been corrected. For example, in Excerpt 5 the instructor uses this formulation to provide advice after a problem has been resolved.

In Excerpt 5 the student had failed to properly set the transponder code. The transponder is a small instrument that allows the pilot to set the code by manually adjusting each of four knobs. The correct transponder code enables autonomous communication of aircraft position to ATC. Well prior to this excerpt, the student made an error during completion of the "Taxi Checklist" while the aircraft was still parked. While they are still on the ground and now just before takeoff, the instructor works to help the student correct this omission. Since they have not yet taken off, there are no urgent time pressures or immediate safety concerns when this exchange occurs.

Excerpt 5: IW used in a post-action explanation (Video)

01 STU3: ((STU3 completing checklist item for takeoff briefing))
02 STU3: ((STU3 looks up from checklist towards transponder))
03 STU3: transponder's [on ((STU3 reaches for transponder, doesn't
04 touch it, flips hand in air)) (>I already did that<)
05 ((hand back to checklist))
06 TWR: [(and) Dog One traffic
07 STU3: [(2.6) ((STU3 looks at checklist, looks up, touches switches))]
08 TWR: [F sixtee:::n (.) five miles north of the field on]
09 TWR: [( ) key runway ( )]
10 STU3: [closed and latched flaps are set for takeoff]((reaching for
11 flap handle, doesn't touch it)) (0.7) landing light as required
12 contact tower for takeoff clearan ((STU3 points at radio))
13 (0.5)
14 INS3: alright so:, ((INS3 looks at checklist in STU3 lap))
15 (2.5) ((INS3 continues to look at checklist, STU3 glances at
16 INS3, back at checklist))
17 INS3: missed a step (0.4) ((INS3 clears throat))
18 s[o::: (.)] when you did number fiftee:n?,
19 TWR: [(Southwork) One roger]
20 (4.8) ((INS3 and STU3 looking at checklist))
21 INS3: what's somethin' else you gotta worry about mister radar man?
22 ((INS3 and STU3 looking at checklist in STU3's lap))
23 STU3: (3.1) ((STU3 looks at transponder, then begins dialing in proper
24 assigned transponder code))
25 INS3: [they'll be gettin' two airplanes out there with the same squawk]
26 STU3: [((STU3 continues to dial in proper code to transponder))]
27 (2.0) ((STU3 continues to dial proper code in transponder))

28 INS3: [awe you don't work approach though do ya]
29 STU3: [((STU3 still adjusting transponder code))]
30 STU3: ((still adjusting transponder)) nope. (.) I'm a
31 [tower] guy but I still understood [the the] reference (.) so.
32 INS3: [sorry] [he he he]
33 (0.3)
34 INS3: yeah::
35 TWR: Endo Two cross [runway ( )] now.
36 STU3: [four six one three]
37->INS3: there ya' go. I'd a set that ((INS3 motions head in direction of
38 parking place)) back at the chocks (0.5) once ya' get it
39 (0.4) that way you won't forget it.
40 (1.1)
41 STU3: (prob'ly) I didn't even look because that's always (.)
42 generally set but
43 INS3: yeah:: [don't can't bet on that here they'll surprise ya']

As the excerpt begins, the student is engaged in completing another checklist, the "Before Takeoff Checklist" (lines 1-5). This checklist offered another opportunity for the student to catch his error. Lines 2-5 of the excerpt show the student working on the part of this checklist that deals with the transponder. When the student again fails to enter the transponder code, the instructor waits until the student nearly reaches the end of the checklist to intervene. Instead of correcting the student, he uses a series of clues and in course guidance to help prompt the student to notice the mistake himself. This correction sequence begins in line 14 ("alright so:,"). The instructor begins with indirect "cluing" techniques (McHoul, 1990). The instructor's gaze toward the checklist in the student's lap directs the student's attention to the checklist (lines 14-15).

While successfully directing the student's attention to the checklist (lines 15-16), the student does not yet acknowledge the problem with the transponder code.

The instructor then upgrades his intervention to a marked form of other-initiated correction: "missed a step" (line 17). The instructor waits for a response, but none is forthcoming ("(0.4) ((INS3 clears throat))"); line 17). The instructor then produces a drawn out transition marker "so:::" (line 18). When a response from the student is still not forthcoming, the instructor produces a more explicit hint: "when you did number fiftee:n?," (line 18). Item number fifteen on the checklist contains the transponder reference. This is followed by another pause (line 20) during which they are both still looking at the checklist. The instructor then offers another hint ("what's somethin' else you gotta worry about"; line 21). This clue identifies the problem as something "else"—in other words, something that was missed. The extension of this turn with "mister radar man?" provides an even more pointed clue, as it reveals that the problem has something to do with this student's fulltime job as an air traffic controller—a job that deals with transponder codes on a daily basis. After another pause (line 23), the student begins to correct the problem and continues working on it during the talk in lines 23-36. After the problem has been fixed the instructor responds ("there ya' go."; line 37).

The instructor then uses the hypothetical "I'd" to set up his instruction as advice rather than as correction of an error: "I'd a set that back at the chocks (0.5) once ya' get it (0.4) that way you won't forget it." (lines 37-39).[6] The instructor's transformation of an otherwise instructional directive into a suggestion through the personal hypothetical IW formulation displays an orientation to the student's autonomy. It's not "Set that back at the chocks..."; it's "I'd a set that back at the chocks..."; thereby showing what the *instructor would have done* rather

[6] The chocks are portable barriers used to block the wheels from movement—the instructor is referring to the previous checklist that was completed while the plane was still parked—back at the chocks.

than telling what the *student should have done*. He thereby teaches a process for completing the checklist that could have prevented the omission from occurring in the first place.

The hypothetical formulation also softens the impact of the correction by avoiding direct criticism of the student. The instructor teaches ADM by showing the student how to use context (the checklist completion while the plane is still parked) to remember to set the transponder, thus avoiding a potential error ("that way you won't forget it."; line 39). The instructor's post-error correction personal hypothetical IW formulation provides instruction on how to avoid a similar error in the future, by revealing his thinking process—the procedure he "would use" to prevent missing an important item on the checklist. The critical professional skill the student is learning here is not to assume things—the items on the checklist must always be checked, even if you "know" that they don't need to be checked. With his personal hypothetical IW, the instructor displays his professional vision of accomplishing the right checklist at the right time in the right way and educates the student's attention on how to "see" a checklist.

4.3.4. Personal hypothetical IW for general advice-giving through hypothetical scenarios

In the previous sections we described how the personal hypothetical IW formulation was used in response to student actions in order to provide advice, instruction, correction, or other types of interventions. In these data there were also some instances of IW used for provisioning of general advice or instruction which was not tied to specific events or actions during the lesson. In this section we show how instructors can use IW to create a hypothetical scenario in order to provide this type of general advice. Instead of telling the *student what to do* or what the *student should have done*, or what the *instructor would have done* in a particular instance, the instructor provides general advice and tells *what the instructor would do* by creating a hypothetical scenario.

Before Excerpt 6 began, the instructor and student were discussing where to land in the event of engine failure. As the excerpt begins, the student reissues a hypothetical question about whether the instructor would prefer to fly over land or water (lines 1-5),[7] marking the resumption of this line of questioning with "so anyways..." (line 1). The student uses "would it be::" and "would you rather..." (line 1) to frame this as a hypothetical question. The instructor responds to the student's hypothetical question with an answer framed with a personal hypothetical "I would." Several lines of transcript are omitted from the excerpt; as is common in aviation, ATC interruptions and brief exchanges about currently necessary ongoing work involved in flying the plane routinely interrupt a line of talk (Nevile, 2004a; 2006).

Excerpt 6: IW to give general advice (Video)

```
01    STU3: [>would it be<] so anyways would it be:: would you rather do a
02          seventy five hundred feet altitude or ninety five hundred or::
03          and go over the water, or just (0.8) u:h there's a airport over
04          there, I don't know what it is, but there's one that would be a
05          good checkpoint and to then turn after turn right after that.
06          (0.5)
07    INS4: well one thing you want to consider are the winds aloft.
08          (1.4) you know if (0.5) the difference between thirty five
09          hundred and ninety five hundred could be a::
((lines 10-19 ommitted--ATC request; STU3 discusses with INS4 and responds to
the request))
20    INS4: °yeah° you want to consider the winds a↑loft because I mean it
21          could be a twenty or a thirty knot wind (.) difference (0.5)
22          at those   alti[tudes]
```

[7] In single-engine airplanes, flying over water is discouraged (Bertorelli, 2014).

((lines 23-40 omitted, primarily ATC interacting with other planes))

41 -> INS4: if=yeah, the first thing I would do:, is I would (.)
42 you know look at winds: as a factor. (0.5) an:d=all right (.) if
43 a::h (1.3) if the winds favored?, (0.4) me to go up higher?,
44 (0.3) then yeah I may go over: (0.3) that little G-P-S waypoint
45 heaven >or something like that a little off shore< (.) but (0.3)
46 if there was gonna be a crazy headwind and it was going to be to
47 my advantage to be ↑lower, (.) then I would go a little out of
48 the way (0.3) to find some sort of a visual checkpoint and then
49 turn.
50 (1.5)
51 STU3: okay.
52 (.)
53 -> INS4: so I would base my altitude first and foremost on winds. (2.0)
54 and then, looking at your winds, then (0.3) deci::de you know
55 your your route.

The instructor begins his answer with a "well" preface (line 7), suggesting that a more-than-expected, complex response will be forthcoming (see Pomerantz, 1984; Schegloff & Lerner, 2009) to the student's hypothetical question about whether he'd rather fly over water or land. The instructor then frames his response as a multi-unit turn (Schegloff, 1996) with "one thing you want to consider are the winds aloft." (line 7). After beginning to talk about wind speeds (lines 8-9), the instructor drops out in response to an ATC interruption (Nevile, 2004a). When he resumes his response to the student's question he repeats his first point ("you want to consider the winds a↑loft"; line 20) that he had initially produced in line 7. This repetition displays the status of line 20 as a resumption of his answer to the student's question. His continuation of the topic of wind speed is again cut off by ATC radio transmissions (in omitted lines 23-40). After

these interruptions, the instructor again resumes his response with “if=yeah,” followed by “the first thing I would do:,” (line 41). These references to “the first thing” and “I would” use what Goodwin and Goodwin (1987) call “format tying”; the repetition of these phrases from prior talk work to formulate his turn as a continuation of the answer he had begun in line 7, and to frame his answer as responsive to the student’s “would you” question. The “I would” at this point in his response accomplishes a shift from informing about factors that should be considered (as in lines 20-22) to a personal hypothetical account which illustrates what his decision-making process in this type of situation would be. The instructor continues to formulate his answer as a hypothetical response: “if the winds favored?,...” (line 43) and “if there was gonna be a crazy headwind...” (lines 45-46). Throughout the response in lines 41-49, the instructor introduces various factors he would consider to make an informed decision. By using the hypothetical framing to share these factors along with the uncertainties, he makes the decision-making process salient to the student.

The instructor then produces an upshot of his extended answer, beginning with “so” in line 53, followed by a summary of what he would do (“I would”; line 53). The instructor’s stress on the word “I” further emphasizes the hypothetical nature of his response, and implicitly suggests that by telling what he would do and describing how he would do it he’s not advocating that the student reach the same decision. Rather, he is advocating and demonstrating, through his hypothetical account, how one (a professional pilot), would make such a decision. Note that the second part of his upshot is “then, looking at your winds, then (0.3) deci::de you know your your route.” (lines 54-55). The instructor has switched from “I” to “you”, thus departing from the personal hypothetical formulation and instead using the general “you” (which could also apply to

the student).[8] This transition to the second person pronoun explicitly puts the student in the position of decision-maker.

Excerpt 6 thus illustrated how IW can be used to teach ADM.[9] The instructor is simultaneously informing the student as to what environmental factors have to be considered (e.g., winds), and what actions the student needs to take (e.g., "looking at your winds"), while emphasizing that the determination of the route is not a mechanistic outcome of the information and the recommended actions, but rather the student must "deci::de you know your your route" (lines 54-55). Through his hypothetical answer the instructor serves as an expert role model and highlights features of the environment the student must attend to; he corrects the student's understanding of the route decision as flying over land or water to include seeing the winds and considering them as he makes the decision. The instructor therefore teaches the student an aspect of professional vision in this context—how to see the environment so that he can build an appropriate mental model of the scenario before him and thus accomplish the ADM process.

5. Discussion and conclusions

5.1. Summary of findings

In this paper we have shown how instructors teach both technical skills and ADM—the process of integrating risk management, situation awareness, and resource management in order to successfully pilot a plane. Through the analysis of a series of excerpts from actual in-flight lessons, we showed how instructors use routine interactional techniques including IW to enact

[8] Lerner and Kitzinger (2007) view switching from different forms of self-reference (e.g., from "I" to "we") as types of footing shifts (Goffman, 1981), and note that the work done by these shifts can display an orientation to "their own entitlements to knowledge and experience and to the entitlements of their co-participants" (Lerner & Kitzinger, 2007, p. 540).

[9] See also Summers, Ayers, Connolly, and Robertson (2007) related to scenario-based training of pilots.

the multi-dimensional roles of instructor, potential co-pilot, and safety manager as they respond to, guide, and assist the student's 'learning by doing' during the training flight. First, we noted that since this type of instruction occurs in a 'learn by doing' pedagogical context, the student is flying the plane while the instructor is engaged in teaching; instructor responses are therefore designed to fit with the contingencies of the ongoing situation, whether there be time constraints, "teachable moments," or safety concerns. In Excerpt 1, faced with a devolving situation, the instructor first highlighted problems and provided opportunities for the student to correct those problems. As safety became a concern, the instructor transitioned to unmitigated, unequivocal FAA-prescribed phrases to preserve safety margins. In this situation, an IW formulation was not used. However, in Excerpt 2, the less urgent contingencies of the situation afforded the instructor the opportunity to use IW to mitigate a directive and form a polite request. We included Excerpt 2 to provide contrast with the remaining cases of a personal hypothetical formulation of IW, which may also include elements of mitigation.

In Excerpts 3 through 6, the instructors used the IW formulation as a personal hypothetical, conveying what they would have done in a given situation. The personal hypothetical IW enabled the instructor to give advice or make suggestions while displaying an orientation to the student's autonomy. IW formulations also enabled instructors to respond to student errors with other than a direct repair or correction; instead using these mistakes as "teachable moments" to model ADM in specific situations. The students in the excerpts in which instructors used the personal hypothetical IW were learning fairly basic technical skills which may appear to be straightforward to teach and to learn: how to exit a holding pattern (Excerpt 3), how to fly a heading (Excerpt 4), how to complete a checklist (Excerpt 5), and how to plan a route (Excerpt 6). However, these data show that the instructor is teaching a process, not just

technical skills and information: a process for "seeing" and acting upon relevant factors to accomplish a task or make a decision. Interactional work is required to convey the process the professional pilot goes through to perform these skills through competent situation awareness and ADM. The instructor's use of the personal hypothetical IW enables them to teach this process and role model professional competence.

As shown in our discussion of the excerpts, professional vision is a component of the skills required to complete many of these tasks, whether it be learning how to translate digital information on an instrument to a mental model of a location (Excerpt 3), to integrate information into the decision-making process (Excerpt 4), to increase compliance with required actions (e.g., completing a checklist) (Excerpt 5), or to see the environment the flight occurs within as a multi-faceted phenomena rather than as an either or choice (as levels of wind along with land and water, rather than as between land or water) (Excerpt 6).

In addition, this analysis has shown that part of the instructor's professional competence is being able to detect where time constraints allow space for the use of instructional interventions such as the personal hypothetical IW. In Excerpt 1 the instructor made a timely transition from attempting to engage the student in decision-making and corrective action to taking over control of the aircraft in order to prevent a potentially dangerous outcome. In the remaining excerpts, IW was used in interactional contexts in which time constraints were more flexible. Through these choices, the instructor displays his ability to recognize the nature of current time constraints and to use IW formulations during times without urgent time constraints—a display of both professional and interactional competence.

In order to successfully implement standard operating procedures the student must have a habit of noticing, evaluating, and integrating information rather than simply knowing what the

procedure is (Kääntä, 2014). These findings suggest that instructor use of IW formulations enable the more knowledgeable party (the instructor) to present his/her knowledge as personal, hypothetical, and contingent rather than authoritative. These activities by their very nature involve continual in-the-moment decision making by the instructor based on awareness and evaluation of wide-ranging information sources. In the dynamic environment of an airplane in flight, complete with task saturation and numerous distractions, students must learn to take the role of decision-maker.

5.2. Doing "being a role model" through the personal hypothetical IW

The FAA's (2008) guidelines interpret the term "role model" as a mentor, subject matter expert, and someone the student may imitate. They advise instructors to facilitate student's development of decision-making capabilities by promoting student autonomy through acting in "the role of mentor and/or learning facilitator" (Chapter 6, p. 10). By using the personal hypothetical IW to describe *what they would do* or *would have done*, instead of telling students *what to do*, instructors may act as role models and convey their expertise through demonstrating the processes they use to do their job.

When projecting an expert role model the instructor often makes salient for the student complex features of the craft that "animate the discourse of the profession" building "professional vision" (Goodwin, 1994, p. 606). By describing what they *would do* if they were flying the plane, instructors were able to serve as expert role models for the students to help them fine-tune their attention and develop their decision-making abilities and professional vision. The personal hypothetical IW formulation is one way instructors convey professional competence. The provisional and contingent nature of these IW formulations is highly functional for displaying how implementation is done and enabling the instructor to serve as a role model for

students who are working to develop their own abilities for this type of integrated thinking, noticing, and doing.

5.3. Interactional competence in flight instruction—alternatives to scripted responses

Our analysis suggests that standardized, scripted approaches to communication are likely to be limited in their effectiveness if they prevent instructors from using the range of interactional resources available to them to perform the work of teaching, advising, and correcting in other-than direct ways. We make this observation with caution, because as we saw in Excerpt 1 aviation safety mandates the use of operationally scripted, standard callouts like "my flight controls" when the situation warrants it (see Neville, 2004a). However, as shown by Maynard, Houtkoop-Steenstra, Schaeffer and van der Zouwen (2002) in the case of survey research, Garcia (2016) in the case of ATC/pilot interactions during flight emergencies, and Hultgren (2019) in the case of customer service calls, ordinary conversational procedures and competences are often more effective in accomplishing the goals of the work setting than are pre-set, scripted responses. The use of the personal hypothetical IW in Excerpts 3 through 6 illustrates how multiple goals can be accomplished using ordinary conversational procedures such as IW rather than prescribed responses. Further, this framing of the instructor's personal experience, preferences, or reasoning processes is consistent with the goals of the scenario-based training approach advocated by the FAA (see Summers, Ayers, Connolly, and Robertson, 2007, for an overview). In other words, limiting flight instructors to standard ways of teaching "standard operating procedures" could limit their ability to teach students not just the procedures themselves, but how, when, and why to follow them. The use of the personal hypothetical IW is one viable interactional technique for achieving this goal.

5.4. Future research

In this article we have shown that and how interactional competence is a critical component of teaching someone how to fly a plane. We have examined the use of the personal hypothetical IW by flight instructors; students' use of hypothetical IWs should also be examined in future research. Future research should also explore its use in a broader range of aviation contexts (such as commercial pilot crew interactions) as well as its use in non-aviation instructional contexts, including technologically mediated interactions (such as online coaching or tutoring). This research may also include exploring different types of interactional work done by IW more generally, including everyday interactional contexts. Given well documented challenges in communication between native and non-native speakers of a language, IW usage should be investigated both for native and non-native English speaking flight instructors and students. One area we did not explore was the customer service role of the instructor, whereby the instructor works to maintain a positive vendor/customer relationship between himself and the student due to competition with other instructors or flight schools; future research may explore customer service and other potential overlapping roles of the instructor.

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