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Teaching Proto-Indo-European as a constructed language

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12.1 Introduction

This chapter attempts to conflate the authors' research areas in Indo-European Studies (IES), language pedagogy, and general linguistics into a unique method for teaching IES and historical linguistics simultaneously. The advances that the authors have been able to make in their own teaching practices have come through the application of pedagogies from other disciplines that have been learned in collaboration with other colleagues and with each other, as well as through multiple workshops and training in curriculum design and multimodal learning.[1] When discussing linguistics pedagogy, there is no standard handbook of teaching linguistics that is used in the training of new instructors (in comparison to the plethora of introductory textbooks devoted to teaching writing or languages, for example). Useful articles on specific tools to improve the teaching of linguistics can be found in various journals, such as Squires and Queen's 2011 article on using mass-media clips for teaching American Speech patterns, yet there is not a single practical guide for instructors to use that discusses overarching theories of teaching and learning. Additionally, it is extremely rare, if not unheard of entirely, for graduate students in Linguistics departments to complete any formal training in teaching methods or educational psychology beyond a couple weeks of basic lesson planning and microteaching. Therefore, the advances in transformative learning that have been made in educational psychology have taken longer to reach linguistics, as

[1] Brenna would like to thank the American Association of Teachers of German (AATG) for selecting her to participate in a three-day workshop on curriculum redesign in 2014, and the University of Kentucky Presentation U for selecting her to participate in a mentored faculty fellows program 2015–17 on multimodal learning. Both of these opportunities, as well as continued mentoring by Molly Reynolds at Presentation U, contributed greatly to her understanding and implementation of pedagogies that promote transformative learning.

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well as many other disciplines at the university level (For a summary of the core principles of transformative learning, see Slavich & Zimbardo 2012). Additionally, faculty are not routinely offered opportunities to learn new teaching methods, nor are there usually any professional incentives for faculty to radically change the way subject material has been taught for decades. This means that many faculty still heavily rely on behaviorist models of learning, using lectures for class time and exams which test the ability to repeat back what the faculty covered in the lecture (Fosnot & Perry 2005). The focus of many courses at the university level is on the delivery of facts, and the students are responsible for memorizing these facts, as evidenced by the types of assessments used in class. Yet research indicates that not only is the lecture format not as effective for long-term retention as student-centered, collaborative-style learning, the recent generation of students is also less interested in reading through long texts or listening to lengthy lectures, preferring a more interactive learning experience (Michael 2006; Twenge 2009).

IES is perhaps the most conservative subfield of linguistics, being one of the founding subjects of the discipline and still attracting mostly scholars of classical languages. While other types of linguistics classes may offer some active learning strategies[2] in the form of analysis of data sets for patterns, rules, or strategies that explain the alternations and exceptions at hand, this is not the case for IES. In general, within subdisciplines such as phonology, morphology, and syntax, an example set of data is presented to the students and discussed, leading to the formation of strategies for pattern recognition, discussion of correct formatting and notation, and the incorporation of the ramifications of the data on current conceptions of linguistic theory. At this point, students are introduced to additional data or a different problem set, which the student is expected to analyze using the strategies taught to them thus far.

In IES, however, it is extraordinarily rare that only a single change or a single type of change has occurred in the evolution of the words from Proto-Indo-European (PIE) to their cognates in an attested daughter language. This makes handling actual data much less manageable for students—and therefore much more overwhelming. In addition, multiple rules do not usually coexist in

[2] We use the definition of active learning from *The Greenwood Dictionary of Education* (Collins & O'Brien 2011: 6): "The process of having students engage in some activity that forces them to reflect upon ideas and how they are using those ideas. Requiring students to regularly assess their own degree of understanding and skill at handling concepts or problems in a particular discipline. The attainment of knowledge by participating or contributing. The process of keeping students mentally, and often physically, active in their learning through activities that involve them in gathering information, thinking, and problem solving."

a single synchronic grammar, which requires a chronology for the changes in question: in order for the derivation to work, rule 1 must precede rule 2, etc. For instance, let us say we are deriving words from PIE into Old English (OE), such as the most basic words of kinship: 'mother', 'father', 'sister', 'brother'. It is simple enough to lecture that PIE **meh₂tḗr* > OE *modor*, PIE **ph₂tḗr* > OE *fæder,* PIE **swésōr* > OE *sweostor*, and PIE **bhréh₂tēr* > OE *broþor*, but nearly impossible for students to discover the processes required without explicit instruction, as each derivation requires multiple changes, with each change ordered in a particular way. Thus, PIE **méh₂tēr* is realized as **mah₂tḗr* already in PIE, as **mātḗr* in a very early post-PIE period, as **māþḗr* in Proto-Germanic, then **mōdḗr*, then **mǫ́dēr*, and finally in OE, *modor*, with the change of **-e-* to *-o-* in the final syllable (Ringe 2006: 12). To further complicate matters for students, in order to understand the data set in question, one typically has to have a fairly comprehensive background in the subject matter. Thus, in order to fully grasp the linguistic history of English, one needs to have studied at least some Old English, and preferably other ancient Germanic languages as well, such as Gothic and Old High German. It is therefore uncommon to see any type of active learning in an IES course unless students are already experts in multiple ancient languages, making truly *introductory* IES courses less engaging and less likely to attract new students to the field.[3]

It is against this background that we propose a way of teaching IES that allows for students with no background in either linguistics or ancient languages to become intimately familiar with both the PIE language and PIE culture, as well as the nature of language change, all within a single introductory course. By using a constructed language (conlang) version of PIE in the classroom and teaching it as if it were a living language, we propose that instructors will be able to teach the foundations of IES as well as the basics of historical linguistics to a wider range of students from a more diverse background (for a definition of conlangs and their use within teaching linguistics, see Sanders 2016: 192). In addition, the application of the principles of transformative learning (Slavich & Zimbardo 2012) will hopefully improve students' ability to perform analysis and boost student interest and motivation in the course material and the field as a whole.

[3] Many courses, although called, for instance, "Introduction to IES" still require a significant amount of work with either linguistics or language study before the applicant is allowed to take them. For example, Uppsala University requires a minimum of thirty hours of language study and graduate student level status before a student can take the Introduction to Indo-European Linguistics course. These courses are rarely offered as undergraduate courses without substantial prerequisites.

Our method for teaching Indo-European (IE) linguistics by using PIE as a conlang was not invented overnight, but rather gradually evolved out of multiple experiences that both authors had leading up to our work on the video game *Far Cry Primal,* for which we created two working versions of PIE and trained the actors both virtually and on set to speak these languages in a believably authentic manner. In this chapter, we will detail the journey taken to arrive at the conclusion of teaching PIE in this way, in an effort to be transparent and perhaps also to embolden others to take risks with their own instruction that could lead them to exciting and unpredictable results. We also want to stress the importance of seeking interdisciplinary collaborations whenever possible, as we have found this to be a continued source of inspiration for new ways to think about things we may take for granted in our own fields. The combination of Brenna's background in language teaching and pedagogy and Andrew's in linguistics and IES has resulted in numerous fruitful collaborations, one of which is the format of the Introduction to Indo-European Studies course that Andrew has taught at the University of Kentucky, which we discuss in this chapter.

12.2 The traditional approach to teaching Indo-European Studies

For nearly a century, the study of PIE and the evolution of the IE languages had been synonymous with linguistics as a whole, with IE linguistics dominating the field up until the early twentieth century. Ferdinand de Saussure, the founder of structuralism (and many say, of modern linguistics) was himself a student of IE, a synchronic reactionary within a group of scholars that was preoccupied primarily with diachrony, and a scholar widely hailed as one of the great Indo-Europeanists for positing the PIE laryngeal theory, among much else (Fortson 2010; for a comprehensive early history of IE linguistics, see Pedersen 1924). The advent of structuralism and the rise of synchronic analysis in general led to a decline in interest in diachrony, leading to a significant decrease across North America and Europe in both professorships and students in the field of IES; in fact, since the authors finished graduate school in 2010, only one tenure-track job in North America has been publicized specifically for an IE linguist. It is therefore not hyperbole to note that the field of IE linguistics is not as healthy as it once was. Awareness of the field is most likely also in decline, given that fewer students today are studying ancient languages, which is usually a prerequisite for studying IE. For instance,

according to a recent study,[4] there has been a marked decrease in the study of Latin in the United States over the twentieth century. In the mid-1930s, the number of Latin students was at its peak at 899,000; in 1962, this number fell to 702,000, with a precipitous drop by 79 percent in 1976 to 150,000, rising slightly to 188,833 in 1994. Much of this decline in Latin education may be attributed to a change in college requirements as well as an attitudinal shift in what constitutes an "educated" individual. In any case, the field of IE has lost the relevance on the international stage that it once held, and many programs have been in decline or have been closed entirely in the past fifty years.

Yet, despite the dwindling number of students in the Classics, introductory courses to IE linguistics have not deviated much from a traditional classroom format. Courses tend to revolve around the lecture, with supplementary readings including seminal articles and books on topics that are difficult to convey in a concise manner in an introductory textbook. Typically, instructors will assign an IE handbook to accompany class lectures, such as Szemerényi 1999, Clackson 2007, Fortson 2010, Meier-Brügger 2010, or Beekes 2011. Courses invariably include a survey of the most archaic IE languages, such as Latin, Ancient Greek, Sanskrit, and Hittite, which either follow an explicit overview of the PIE grammar or provide the basis for the discussion of particular grammatical reconstructions. Thus, instructors may decide to teach about the possible evolution of the thematic conjugation[5] from an earlier *h_2e-conjugation[6] within an overview of PIE itself, or they may choose to do so in the context of the *ḫi*-conjugation of Hittite. Other typical approaches are to briefly introduce IES within a course on historical linguistics or an ancient IE language, such as Gothic or Sanskrit. While aspects of IES may be introduced in these courses, such as the comparative method or specific sound changes like Grimm's Law, we are not including these courses in our discussion in this chapter, as their learning goals are limited in the expectations of the student's knowledge of the field by the end of the course.

When Andrew first taught IE linguistics at the University of Kentucky (UK) in Spring 2012, the course had not been taught at UK in over fifty years. Given

[4] http://education.stateuniversity.com/pages/2160/Latin-in-Schools-Teaching.html (accessed June 1, 2018).

[5] There were two basic types of verbs in PIE: those which utilized a thematic vowel *-*e/o*- after the root, such as *b^h*er-e-ti* 'carries' (continued by Latin *fer-i-t* 'carries', Greek *p^her-e-i*, Sanskrit *bhar-a-ti*) and those which did not, which are called athematic verbs, such as *h_1*es-ti* 'is' (continued by Latin *es-t*, Greek *es-ti*, and Sanskrit *as-ti*).

[6] This controversial theory, meticulously set forth in Jasanoff (2003), puts forth the idea that the Hittite *ḫi*-conjugation is an archaism, and that certain PIE roots were not inflected in the present and aorist systems with the expected endings *-*m(i)*, *-*s(i)*, *-*t(i)*, etc., but rather *-h_2e, *-th_2e, *-*e*.

that this was also the first time he had taught this particular course, he decided to teach it in a way that could be best described as traditional to the field: most classes were lecture-based, and the learning goals were to be able to repeat the information covered in the course and to apply this information to reconstruction sets on a take-home final exam. He used Benjamin Fortson IV's textbook *Indo-European Language and Culture* (2010, first published in 2004), which contains a broad overview of the language, culture, and historical context of each branch of Indo-European, as well as exercises on internal and comparative reconstruction methods. Fortson's 2010 book is an incredibly valuable reference guide for both students and scholars alike, broad in its scope and comprehensive on nearly all topics. However, given its breadth and depth, the book can be a bit intimidating as an introductory textbook for those without any prior knowledge of ancient IE languages or linguistics.

Fortson presents the field as is typical in an introductory course to IES, by beginning with a history of the field and its methodologies (such as the comparative method, internal reconstruction, and the importance of philology). He then gives an overview of what most scholars believe to be true of PIE culture, looking into questions of the IE homeland, the types of plants and animals which lived among these people, the gods they believed in, and the cultural practices they held. At this point, Fortson produces a concise look of the reconstructed PIE grammar (phonology, morphology, nominal morphology, verbal morphology, and syntax), followed by specific histories of each language branch (as well as *Restsprachen*, IE languages which contain small corpora and which are not classified in any of the main ten sub-branches, such as Messapic, Venetic, and Phrygian).

In the past, IE introductory handbooks solely provided textual overviews of the fundamental concepts in IES. One benefit of using Fortson 2010 is that for the first time in the history of the field, exercises are found at the end of each chapter, which the instructor may use for assignments throughout the course, such as the following exercise from Chapter 15 on the history of the Germanic branch:

(1) Sample exercise assessing knowledge of Germanic Sound Laws (Fortson 2010: 379)

Give the PIE sound from which the boldfaced sounds in the English words below are likely to have descended:

a. *lee**ch***	c. *see**p***	e. ***st**are*	g. ***h**ollow*
b. ***qu**oth*	d. *ha**ve***	f. *roo**t***	h. ***b**loom*

In examining the exercise, the student should have a working knowledge of both Grimm's and Verner's Laws,[7] as well as knowledge of specific phonological changes that have occurred in the history of English (such as palatalization).[8] While the exercises are useful, the reader should note that the majority of them are quite different from most linguistics assignments. The students are not given data with which they may deduce the changes that have occurred based on strategies they have been taught or some particular theory that they are aware of; rather, the exercise above asks the student to first memorize a specific sound change and its relationship (chronology) to other sound changes, and then apply that knowledge to the reconstructed history of a particular word. The sound change is decontextualized—the students do not discuss the naturalness of the change and are not given the opportunity to discover where the sound change in question applied. The result is that this type of exercise is less engaging because it does not adhere to principles of active learning: students do not need to analyze or problem-solve, but instead, to borrow a phrase from mathematics, they take a couple of rules and "plug and chug."

Typically, assessments in IE courses include testing knowledge through exams or papers, the former on specific topics in IE linguistics, such as ablaut or the tense-aspect system, the latter on a specific topic of a student's choosing. In Andrew's 2012 course, assessments consisted of exams that tested student understanding of core concepts and the memorization of specific changes in phonology and morphology within the daughter IE languages. For instance, in the take-home final exam, students were asked to analyze certain correspondence sets, for which they had to reconstruct a common root for PIE and to discuss any phonological or morphological changes that have occurred in that form's history. Two such examples are given below:

(2) Sample final exam questions from A. Byrd's 2012 IES course
   1. Skt. *ániti* 'breathes', Gk. *ánemos* 'wind', Lat. *anima* 'breath'
   2. Hitt. *ta-a-ye-ez-zi* 'steals', OLat. *stātōd* 'let him steal', Gk. *tētáomai* 'I deprive of'

[7] Grimm's Law is typically described as a chain shift of three phonological changes, in which the PIE voiceless stops, voiced stops, and voiced murmured stops become Proto-Germanic voiceless fricatives, voiceless stops, and voiced stops, respectively. Verner's Law describes the shift of voiceless fricatives in Proto-Germanic to voiced fricatives. For discussion with examples, see Fortson 2010: 339–41.

[8] Students' answers should be as follows: (a) **g/ǵ*, (b) **g^{w}*, (c) **b*, (d) **p*, (e) **t*, (f) **d*, (g) **k/ḱ*, (h) **b^{h}*.

To be able to analyze these questions, the students needed to have a working understanding[9] of the sound laws from PIE to the individual daughter languages, as well as any analogical or morphological changes that have occurred in the relevant language or sub-branch, or even in PIE itself. To give an example of the former, to arrive at the reconstruction of *$*h_2enh_1$-* for the first problem, students needed to know that *$*h_2$* "colored" a following */e/ vowel to **a*, and that only *$*h_1$* could be realized as *-i-* in Sanskrit, as *-e-* in Ancient Greek, and as *-i-* in Latin (through vowel reduction of **-a-*). To give an example of the latter, while Hittite *tāyezzi* (< *ta-a-ye-ez-zi*) 'steals' may derive directly from PIE *$*teh_2yéti$* through expected sound changes, the initial *s-* in Latin was a secondary addition of "s-mobile" (Fortson 2010: 76–7), and the unexpected mediopassive ending in Greek *-mai* was analogically refashioned in a number of ways (for which, see Fortson 2010: 259). Each of these facts was explicitly taught to the students through lecture during the course. In essence, the course required them to demonstrate that they internalized this information by applying it in novel situations.

The students who stuck with the course were successful in that they were able to perform well on the assessments described above. But many did not stick with the course—failing to see the relevance of this type of knowledge in their own studies, be they linguistics majors or otherwise. The course initially consisted of a relatively small group of thirteen students, and only one student had a background in an ancient IE language (Latin). Many of them had studied Spanish, German, or French, though some had no background in linguistics or a non-English IE language at all. As was just mentioned, the traditional way of teaching IES assumes some background in either classical languages or linguistics, and in order to cover even the basic problems in reconstructing PIE, a course can only spend a couple days at most on each subset of linguistics, such as phonology and sound change. Anyone who has taught an introductory course in linguistics at the undergraduate level knows just how difficult some of the basic concepts, such as the phoneme, can be for a student who has never before thought about the way language works. It therefore comes as no surprise that the combination of an introduction to linguistics with an introduction to IES in one semester could be overwhelming for students. Consequently, three students immediately dropped the course after the first day of class, and two dropped mid-semester, despite Andrew's working with these students outside of class on a regular basis. Andrew consulted with each student who dropped the course, and the reason for

[9] Not through memorization, however, as this was a take-home test.

dropping was consistent: the material was too hard. What we understand from this repeated statement is that it is wrong to assume that students either know or are able to learn quickly the core concepts of linguistics and language study, and yet, as previously mentioned, this was a necessary assumption for instructors to make in order to make any headway in an IES course (as it is traditionally taught), especially in only one semester.

Even those who did perform well on the assessments found the course a strange bypass in their linguistics trajectory—the "cocktail party knowledge" course of their degree. It is for this reason that the traditional approach to teaching IE linguistics is problematic—for many students, the introduction of a grammatical category, such as the aorist, is not grounded in any previous knowledge and is untethered to any conception of language or linguistics that they hold. Moreover, the traditional approach creates an uneven playing field for students—their background in large part determines their success in the course. Many students interested in the prehistory of English are surprised to discover that they will need a background in Latin and Ancient Greek to be able to follow the discussions in an introductory IES course. Additionally, in order for the course to continue to be taught, we needed to maintain enrollment at ten students at the very minimum. The course therefore needed some drastic changes if it was to be offered on a regular basis.

12.3 Teaching Indo-European Studies at UK, second time around

After the authors had taught the introductory IES course in Spring 2012, an opportunity presented itself that changed the way they thought about IES as a field. In the September/October 2013 issue of *Archaeology Magazine*, Eric Powell wrote an article detailing the work of archaeologists David Anthony and Dorcas Brown on the interpretation of the remains of a large number of dogs and wolves at a site in Krasnosamarskoe, Russia, nearly all of which had been butchered in the wintertime.[10] Consulting scholarship in IES, Anthony and Brown made a striking discovery: the sacrifice of dogs may be reconstructed as a PIE ritual, a wintertime initiation ceremony in which young men are brought into a **koryos*, a "roving youthful war band." The magazine decided to include recordings of PIE with the article, in order for the public

[10] https://www.archaeology.org/issues/102-1309/features/1205-timber-grave-culture-krasnosamarskoe-bronze-age (accessed June 1, 2018).

to obtain a better understanding of what PIE was. Powell asked Andrew to edit and record a sample of himself reading aloud two fables reconstructed in PIE, which were posted online at the end of September 2013. As of the date of writing this chapter (June 1, 2018), the two recordings have received well over one million listens on Soundcloud, the more popular of the two being his rendition of the fable "The Sheep and the Horses" by August Schleicher (with substantial updates by H. Craig Melchert). The fable goes as follows:

> *h₂áu̯eḭ h₁ḭosméḭ h₂u̯l̥h₁náh₂ né h₁ést, só h₁éḱu̯oms derḱt. só gʷr̥hₓúm u̯óǵʰom u̯eǵʰed; só méǵh₂m̥ bʰórom; só dʰǵʰémonm̥ h₂ṓḱu bʰered. h₂óu̯is h₁ékʷoiu̯bʰḭos u̯eu̯ked: "dʰǵʰémonm̥ spéḱḭoh₂ h₁éḱu̯oms-kʷe h₂áǵeti, ḱḗr moḭ agʰnutor". h₁éḱu̯ōs tu u̯eu̯kond: "ḱludʰí, h₂ou̯eḭ! tód spéḱḭomes, n̥sméḭ agʰnutór ḱḗr: dʰǵʰémō, pótis, sē h₂áu̯ḭes h₂u̯l̥h₁náh₂ gʷʰérmom u̯éstrom u̯ept, h₂áu̯ibʰḭos tu h₂u̯l̥h₁náh₂ né h₁esti. tód ḱeḱluu̯ṓs h₂óu̯is h₂aǵróm bʰuged.*
>
> A sheep that had no wool saw horses, one of them pulling a heavy wagon, one carrying a big load, and one carrying a man quickly. The sheep said to the horses: "My heart pains me, seeing a man driving horses." The horses said: "Listen, sheep, our hearts pain us when we see this: a man, the master, makes the wool of the sheep into a warm garment for himself. And the sheep has no wool." Having heard this, the sheep fled into the plain.

The popularity of these recordings, combined with Brenna's interest in proficiency-based language instruction, sparked numerous conversations between the two authors on whether PIE could be taught as if it were a living language. Both authors vividly remember an exercise in Donka Minkova's Old English class at UCLA in 2004 where we were asked to translate popular song lyrics into Old English, with some hilarious and engaging results. We wondered, could such an exercise be as successful in PIE?

This conversation resurfaced when Andrew taught the introductory course to IES for a second time in the spring of 2014. Once again, the course was structured around Fortson's textbook, but this time, in the middle of the term, students would be asked to use their newly acquired knowledge of PIE grammar to translate something from English into PIE. The obvious choice for a translation exercise was a fable, much like the one that Schleicher himself had created. We decided it would be best to ask students to create a fable in English based on a set of core vocabulary that can be reconstructed, which the students would then translate into PIE. The assignment, however, became complicated by the translation task—how do we get students to the skill level of Schleicher himself in less than a semester?

It is at this point that we decided to introduce PIE to the students not as a collection of reconstructed grammatical and lexical facts, but rather as a living language. Traditionally, PIE is the "end product," such that the students are introduced to the reconstruction of a particular word, form, morpheme, or feature in the proto-language through the comparisons of attested forms in the daughter languages. Our approach would be the opposite: students would instead be given a glossary of forms in PIE which they would modify for the translation according to the reconstructed synchronic rules of the language, and only after this exercise delve into the history of the daughter branches.

The first half of the IES course taught in 2014 was quite similar to the first half of the one taught in 2012 (Section 12.2), beginning with an introduction to the methodologies of the field, the reconstructed culture of the Indo-Europeans, and an overview of the different components of the PIE grammar. Around roughly the midpoint of the semester, the students were asked to produce a fable in English in the style and length of "The Sheep and the Horses" using PIE words found in the word index of Fortson 2010. This exercise included the following stipulations: (1) the theme of the fable must be grounded in the cultural themes discussed in Fortson (such as reciprocity, everlasting fame, the names and roles of the gods, etc.);[11] (2) it should make use of the following words: (a) 'bear' (b) 'woman' (c) 'honey' (d) 'smoke' (e) 'put' (f) 'snake' (g) 'house' (h) 'sweet' (i) 'eye' (j) 'see' (k) 'nose' (l) 'sense' (m) 'mouth' (n) 'tongue' (o) 'taste', and (3) any other words must come from the word index at the back of Fortson 2010. The items on the list of required words were chosen for two reasons. First, they are all securely reconstructable for PIE. Second, these words showcase a large variety of morphological categories—among the nominals there are **o-*, **eh₂-*, **i-*, **u-*, and consonant stems; and among the verbs the student must use a variety of

[11] The usefulness of this part of the exercise is that it allows the students to be creative while focusing their attention on the culture and society that we can reconstruct for the Indo-Europeans. Of course, language is not just a grammar; it is entwined in the culture in which it is used. Therefore, when we treat PIE as a complete, living language, we must understand it as deriving from a particular historical time and place, with a specific culture and belief system. Scholars in fact know quite a bit about how and where the Proto-Indo-Europeans lived and how they perceived the world. For instance, it is striking that scholars are not able to reconstruct different words for the concepts "give" and "take"; while there are multiple roots reconstructable (**deh₃-*, **nem-*, etc.), each seems to encode both meanings of "give, take" (Fortson 2010: 22), presenting to us a culture that was fixated upon reciprocity, a belief that permeated all levels of society. This type of cultural knowledge was integrated within the exercise in order to make the active use of PIE more engaging and to lead to a deeper understanding of the culture as a whole.

different inflections, including active and mediopassive verbs, stative perfects, root aorists, etc.

The students then submitted their fables and the whole class voted anonymously for the one they felt had the best narrative and best fit the genre of fable. The fable that won was then chosen as the subject of their group translation exercise from English to PIE. Allowing students to create a fable, and then vote on their favorite, provided two separate ways for students to control the content and direction of the learning material, thus combining cooperative and competitive group learning styles to increase intrinsic motivation (for more on the benefits of combining competition and cooperation in the classroom, see Tauer & Harackiewicz 2004). Giving students agency over their learning is a key ingredient in increasing both motivation and also what some refer to as *deep learning*, that is, an understanding of the material that transcends superficial short-term memorization (Fosnot & Perry 2005; Mundy & Consoli 2013). Once the fable had been chosen for the translation task, Andrew simplified the language to remove anything that would be too difficult for the students to construct with the knowledge of PIE they had learned up to this point. The students were given the simplified fable with a full vocabulary list, including important information such as conjugation forms, etc. (see Appendix 1). The students brought their translations into class, and the class as a whole discussed the translations line by line—together, as a class, we discussed the best way in which an Indo-European would have recounted this fable. The course then continued on per the 2012 class syllabus and investigated the histories of the individual language branches.

Overall, the addition of a fable translation exercise was received very well by the students. In the course evaluations, students remarked how much it helped their engagement with the course—it is perhaps for this reason that no students dropped the course in this semester owing to its difficulty, unlike the previous offering. In addition, it provided another way to assess the students' knowledge of categories within PIE, looking at for example their understanding of the different functions of cases, how ablaut works, and when and when not to use perfective and imperfective verbal forms. However, as exciting as this exercise was, the basic structure of the course was the same as that of the 2012 IES course. As before, some students struggled, especially those without a significant background in linguistics and/or the study of highly inflected languages. It is our belief that to make the course more accessible and more comprehensible to those without a linguistics and/or language background, further integration of PIE as a conlang will be necessary (see discussion in Section 12.5).

12.4 PIE in action: Making *Far Cry Primal*

The next collaborative project that we worked on further put the usefulness of teaching PIE as a conlang to the test. Following the success of these fables produced for *Archaeology Magazine*, we were approached by a major video game company, Ubisoft Entertainment SA, to design two languages, Wenja and Izila, for an upcoming project entitled *Far Cry Primal* (henceforth *FCP*), a first-person shooter set at the beginning of the Mesolithic Period. Their idea was quite radical—the characters would speak languages based on PIE throughout the entire game, in order to create a more immersive experience for the player. We were tasked with creating a functioning version of PIE that the actors could not only pronounce, but could also memorize and understand as they spoke it, in order to give effective and believable performances on set.

The creative team at Ubisoft wanted two conlangs that were close enough to PIE to be believable, in order to give players a *feeling* of authenticity that could not be created without the use of a prehistoric language. The perceived authenticity of a fictional world is often vital to its popularity, and the marketing team on the project assured us that the average gamer today would not accept a prehistoric setting whose inhabitants spoke a modern language (and this theory was proved to be correct in the initial market testing of the game). The believability of the fantasy world is a force so strong that it can often outweigh actual academic evidence to the contrary. One example from this game was the inclusion of a large saber-toothed cat, which the main character could tame and ride into battle. All archaeological evidence shows that this animal was extinct by the time of the setting for the game; however, owing to popular fictional narratives that feature not only saber-toothed cats but also dinosaurs coexisting with humans, the inclusion of Smilodon in the game was accepted as authentic *enough* by most of the game's consumers. For the same reason, a prehistoric-*sounding* language was important for the game developers. The actual accuracy of the languages according to research in Indo-European was less important to the developers, and the fact that consumers could virtually not know the difference was of small enough importance for the language designers to take certain liberties.

In the end, we had to constantly negotiate the rules of the languages with both our team of linguists as well as with the writers, directors, actors, and development team at Ubisoft. We learned through trial and error to strike a balance between historical accuracy according to current research, the preexisting beliefs of the consumer, the difficulty of language learning for the actors, and the usability of the language in the game setting. While our goal was

always to make the languages as true to PIE as possible, at times its structure conflicted with the gameplay or with the vision of the *FCP* creative team at Ubisoft. For instance, it was not unusual for PIE words to be much longer than words in English, resulting in overlong cutscenes and in-game interactions, and so the team of linguists[12] was asked to shorten certain common words in both Wenja and Izila, for instance *walkwa* 'wolf' > *wal*.[13] At other times, original features of the PIE language were perceived as being too complicated or even too modern by the *FCP* creative team at Ubisoft, and it is for this reason that Wenja changed from being a pitch-accent language like Swedish, to one that is quantity-insensitive, where trochees are assigned from the left edge of the word.[14] In the end, the team was able to create two full conlangs based on PIE, with lexicons of over 2,400 words combined and two fully functioning grammars, generated through the translation and recording of nearly 40,000 words of dialogue.[15]

We were also tasked with training and coaching actors on set to perform in the languages within motion-captured scenes.[16] The actors were taught the two conlang versions of PIE, Wenja and Izila, using a combination of the Audiolingual Method (ALM),[17] the Total Physical Response (TPR) method,[18]

[12] Owing to the enormity of the task, we requested additional help from former colleagues in the creation and translation stages of the project: Chiara Bozzone (LMU Munich), Jessica DeLisi (The Milken School), and Ryan Sandell (LMU Munich).

[13] The word *walkwa* was re-lexicalized to mean 'wolf-pack' in Wenja.

[14] Note that this change was partially based in our modern conception of PIE prosody, as many now (following Kiparsky 2010) believe the first syllable of a word received stress in the absence of an underlying accent.

[15] For a short behind-the-scenes documentary, see https://www.youtube.com/watch?v=dBiAtokSOzc (accessed June 1, 2018). For an example of Wenja, the primary language of the game, see https://www.youtube.com/watch?v=ZEs5tBVjhJM (accessed June 1, 2018), in which Sayla, the village's gatherer and Takkar, the player character, first interact. For an example of Izila, designed to be a slightly simplified version of the PIE typically reconstructed by scholars (e.g. as presented by Fortson 2010), the reader may watch https://youtu.be/JexrTnlPMBY?t=938 (accessed June 1, 2018), which shows the first confrontation between Queen Batari, the main antagonist in the game, and Takkar.

[16] For those not familiar with video games and the production of CGI, many companies today make use of a process called motion capture, where the physical movements of the actors are captured in detail as they act through a scene, right down to facial expressions and mouth movements. This made it incredibly important that the actors would be speaking the language as they moved through the scenes, so that the digitally rendered characters' lips would synchronize with the recorded lines.

[17] The Audio Lingual Method, where the instructor leads the students through the memorization and acting out of a scripted interaction, was most popular in the United States in the 1960s (Byram 2004). While its reliance on script memorization falls short of the full communicative goals of modern-language classrooms today, it is quite useful for actors preparing for rehearsed performances.

[18] Total Physical Response, another language-teaching method first developed in the 1960s, is most commonly used in introductory language classes (Cain 2004). In this method, the instructor demonstrates concrete actions through pantomime while repeating a sentence in the target language describing the action. The instructor then motions to the students to repeat this action themselves (all while staying in the target language).

and the Direct Method,[19] staying completely in the target language during each of the lessons. All three of these language teaching methods require both the instructor as well as the learners to stay in the target language the entire time, putting the focus on *practicing* the language and learning the grammar *implicitly* instead of talking about the language and grammar *explicitly*. These three methods also put a large emphasis on the repetition of entire sentences as accurately as possible and usually involve the memorization of interactive scripts. Since the goals for the actors of *FCP* were to repeat their lines perfectly, and not to improvise or communicate with actual native speakers of PIE, these methods were deemed the most appropriate. These group lessons were followed by individual coaching on the pronunciation of the lines and meaning of the words and grammar so that actors could make choices about what syllables or words to emphasize based on how they wanted to play a scene. The surprising result of this type of intense teaching of PIE (or modified versions of PIE, as was the case with Wenja and Izila) was that many of the actors were able to spontaneously create new utterances through analogy as well as to understand the grammar well enough to find mistakes in the script even before we noticed them. This intense use of PIE as a spoken language gave the actors a deeper understanding of the language than anticipated, one which is rarely achieved within the lecture-based setting of a traditional introductory course to IES.

After the release of *FCP*, the authors published a blog at http://speakingprimal.com. The website has been the "go-to" resource for fans of the game, who are interested in learning more about Wenja and Izila. The authors have posted grammar and pronunciation lessons, discussions of specific etymologies and how the authors derived the two languages from PIE, and have even included lessons like "How to Flirt in Wenja" (*Ku tiyi shambipachitra? Ti-fakwisu apashkanti buha-buham.* "Do you have a map? I'm getting lost in your eyes.")[20] The website has been quite successful, with over 220,000 visits since going live. Some extra-dedicated fans have made their own compositions in Wenja, such as a discussion of other caveman

[19] The Direct Method (sometimes referred to as the Berlitz Method as it was widely used by Charles Berlitz in his language schools) is another language-teaching method which relies on inductive grammar teaching and total immersion in the target language. Developed in the late nineteenth century, it was the precursor to ALM and TPR, but in practice tends to emphasize more the acquisition of vocabulary associated with pictures and testing student knowledge through simple yes/no or either/or questions (Weihua 2004; Brown 2007: 21–4). This method, like ALM, puts a high degree of importance on correct pronunciation of complete sentences, and is different in this way from the Communicative Approach that became widespread in the 1990s.

[20] http://speakingprimal.com/how-to-speak-wenja-kwati-samkwayha-lija-how-to-flirt-with-someone/ (accessed June 1, 2018).

media in Wenja,[21] a poem about the fictional land of Oros from the game,[22] and even a music video.[23]

12.5 Future class design and transformative learning

Such compositions in Wenja make a key point about the use of PIE as a conlang—when we allow people to be creative in their learning of PIE, it is easier to generate excitement about and engagement with the language and the field in general. It is for this reason that we believe a course that is structured around teaching PIE as a living language that adheres to principles of student-centered, active, and collaborative learning is the optimal approach to creating a truly introductory course in IES and to increasing interest in the field. We are currently designing such a course and Andrew, with Brenna's help, will be teaching it in the Fall 2019 semester.

In this course, PIE is the *first* language the class is introduced to, not the last. By creating a conlang version of PIE, complete with conversational interactions in the language, students can learn PIE as if it were a living language without needing prior knowledge of Greek, Latin, or Sanskrit. As students gain a working knowledge of PIE, they can compare PIE forms to cognates in ancient languages, helping them better understand the linguistic processes that each daughter language has undergone. No longer an abstract exercise, the derivations from PIE into the daughter languages become tangible and real.

The course will derive its structure through backwards lesson design planning from two main learning objectives:

- Students will have a basic working knowledge of the PIE conlang such that they will be able to:
  a) carry on a brief (2–3 min) interpersonal conversation in PIE and
  b) write a short fable in PIE with the help of their notes on the grammar and vocabulary of PIE covered in class
- Students will be able to identify at least seven major branches of Indo-European and at least one attested language from each branch, and, through comparisons with PIE, deduce the most significant linguistic innovations of each branch

[21] http://speakingprimal.com/guest-post-by-dansurka/ (accessed June 1, 2018).
[22] http://speakingprimal.com/urusis-sangwa-konradiha/ (accessed June 1, 2018).
[23] https://www.youtube.com/watch?v=ADT6EUlFmiU (accessed June 1, 2018).

These larger learning objectives can be broken down into smaller manageable tasks for each unit, and three to five smaller goals for each day. For example, personal introductions are commonly found in ancient inscriptions and texts, and usually include the name of the person and their father. The first week of the course will then focus on introductions, with the following learning objectives:

- I can introduce myself, including my name and the name of my parent(s) in PIE
- I can ask someone else their name in PIE
- I can introduce someone else and use the appropriate gendered pronoun in PIE
- I can identify the meaning of at least four family words in PIE
- I can figure out at least two sound changes from PIE into Ancient Greek by comparing cognates in both
- I can use this knowledge of sound change to reconstruct the PIE for a few words in Ancient Greek
- I can identify the linguistic environmental factors that affect how these sounds change
- I can identify the place of articulation of the sounds affected by this change and recognize that place of articulation can affect both how sounds change and how sounds impact and are impacted by nearby sounds

Each day will be broken up into a communicative lesson, followed by linguistic discussion, exploration, and problem-solving, by comparing PIE to sentences or snippets of texts in a daughter language. The communicative lesson will consist of short immersion lessons in PIE, similar to the work that the actors did on the set of *FCP*. Students will learn 1–2-sentence dialogues on sharing interpersonal information, using various language learning methods such as ALM, TPR, etc. Vocabulary is taught through the Direct Method, using images to depict new vocabulary, and they would have some Communicative Method tasks, where they would have to ask for personal information from their neighbors. The immersion part of the lessons would serve a few important functions: first, they would set the stage for thinking about PIE as a living language; second, they would build rapport in the classroom through personal interactions, which would reduce student anxiety and increase their confidence in the classroom; and third, they would be able to observe the language in action before analyzing it and breaking it down into individual working parts. In this way, some basic grammatical structures

would first be learned inductively, that is, through exposure to the language in context rather than explicit teaching (Krashen 1985; Shrum & Glisan 2010). After the communicative lesson, students would work through short exercises in reconstruction to increase familiarity with the comparative method. Again, in order to maintain an active learning style, students would not be simply given the paradigm to memorize but rather would be encouraged to recognize patterns from the daughter languages. To reduce student anxiety and to increase the likelihood that they would be successful in this exercise, most of the reconstruction would be provided for them, and students would work together to fill in gaps in words which they can predict if they find the appropriate pattern in the data. By simplifying the exercise to a point where students would be able to use analogy to reconstruct proto-forms, we can bypass covering the multiple complicated steps that most likely occurred between PIE and the daughter languages.

Classes will end with a review of the learning objectives, students being asked to demonstrate that they can do each task. Finishing with learning objectives gives students a sense of progress and leaves them with a sense of accomplishment for the day. This feeling of accomplishment and the sense that one can learn something well, which is called *self-efficacy* in the educational psychology and second-language-acquisition research, is directly tied to how well students actually perform (Zimmerman et al. 1992). It is therefore important for the success of the class that students not only learn, but that they *feel* that they are learning. Additionally, if students are allowed to work in smaller groups to discuss how to complete exercises, they can build rapport, which will further reduce their anxiety and build motivation for them to succeed in the class. Tasks completed in small groups lead students to feel that they are working together to accomplish a common goal, resulting in a greater desire to continue the course and to contribute to class discussions (Dörnyei & Malderez 1997). A sample lesson plan for a 75-minute class period is included in Appendix 2.

12.6 Conclusion

While the proposed method of teaching is a significant departure from how IES has traditionally been taught, we believe that the changes laid out above would be welcomed by students at the introductory level, especially in secondary and post-secondary institutions where there are few opportunities to study ancient languages. Our experiences in teaching Wenja and Izila to the actors of *Far Cry Primal* as well as teaching PIE through the creation of a fable

in the classroom setting strongly suggest that using a PIE conlang can lead to better student understanding and retention of the basic structure of PIE and the fundamental changes that have occurred in the daughter languages. Moreover, as the incorporation of principles of transformative learning combined with an immersive language experience can lead to higher student motivation and interest, we believe that students will leave the course feeling more rewarded and more motivated to continue study in the field. This fall (2019), Andrew will teach an undergraduate IES course again, using the PIE conlang as the primary teaching tool. We plan to assess this model's effectiveness and hope to publish an update on its use in the near future. We of course invite all interested to teach IES in this manner, and we will gladly share teaching materials and welcome any feedback. Finally, we would like to note that this model of teaching is not restricted to teaching about IES or PIE. We see this as an effective teaching paradigm for any type of historical linguistics course that goes into detail about a particular language family.

APPENDIX 1

(There) was (a) woman. She was (the) wife of (the) king. To her (there) was everlasting fame for (her) sweet honey. A bear smelled (the) honey and went to her house and tasted it. The woman saw (the) bear and thought: "To him are sweet eyes." She put honey onto (a) tree for (the) bear at dawn. The drunken king went to the house, saw honey on the bear's nose, tongue, and mouth, and was furious. He made (a) fire with much smoke, and (the) bear went away. The drunken king did not see, but (a) big snake came and took (the) queen. (The) bear returned and killed (the) snake. He carried (the) queen to her house. The queen gave her heart to (the) bear, and (the) bear became (a) man.

1.	"to be"	*$*h_1esti$*
2.	"woman"	*$*g^wénh_2$*, *$*g^wnéh_2s$* (animate noun)
3.	"he, she, it" (NOM.SG)	*$*só$*, *$*séh_2$*, *$*tód$*
4.	"he, she, it" (DAT.SG)	*$*tósmei̯$*, *$*tósi̯eh_2ei̯$*, *$*tósmei̯$*
5.	"he, she, it" (GEN.SG)	*$*tósi̯o$*, *$*tósi̯eh_2s$*, *$*tósi̯o$*
6.	"wife"	*$*pótnih_2$*, *$*potnii̯éh_2s$* (animate noun)
7.	"king"	*$*h_3rḗḱs$*, *$*h_3réḱs$* (animate noun)
8.	"for"	(use dative)
9.	"sweet"	*$*su̯éh_2du$*- (*u*-stem adjective)
10.	"honey"	*$*méd^hu$*, *$*məd^héu̯s$* (neuter noun)
11.	"everlasting"	*$*n̥d^hg^whitó$*- (*o*-stem adjective)
12.	"fame"	*$*ḱléu̯os$*, *$*ḱléu̯eses$* (neuter *s*-stem)
13.	"bear"	*$*h_2ŕtḱos$*, *$*h_2ŕtḱosi̯o$* (animate noun)
14.	"to smell"	*$*h_3edi̯eti$*
15.	"to go"	*$*h_1ei̯ti$*
16.	"house"	*$*dóms$*, *$*déms$* (animate noun)
17.	"to taste"	*$*ĝeĝou̯se$*
18.	"to see"	*$*derḱt$*

19. "to think" **memone*
20. "eye" **h₃ók^{w}s*, **h₃ék^{w}s* (animate noun)
21. "to put, make" **d^{h}eh₁t*
22. "tree" **dóru*, **dérus* (neuter noun)
23. "dawn" **h₂éu̯sōs*, **h₂usés* (animate noun)
24. "drunken" **madtó-* (*o*-stem adjective)
25. "nose" **nā́s*, **nasés* (animate noun)
26. "tongue" **dn̥ĝ^{h}u̯éh₂*, **dn̥ĝ^{h}u̯éh₂s* (animate noun)
27. "mouth" **h₁óh₁s*, **h₁eh₁sés* (neuter noun)
28. "to be angry" **mn̥i̯etor*
29. "fire" **péh₂u̯r̥*, **pəh₂u̯éns* (neuter noun)
30. "much" **pélh₁us*, **pl̥h₁u̯és* (*u*-stem adjective)
31. "smoke" **d^{h}uh₂mós* (animate noun)
32. "to go away" **ápo . . . h₁ei̯ti*
33. "not" **né*
34. "big" **méĝh₂onts*, **məĝh₂n̥tés* (*nt*-stem adjective)
35. "snake" **h₁óg^{wh}is*, **h₁ég^{wh}is* (animate noun)
36. "queen" **h₃rḗĝnih₂*, **h₃rḗĝniu̯éh₂s* (animate noun)
37. "took" **selh₁t*
38. "to return" **ápo . . . g^{w}emt*
39. "to kill" **g^{wh}ent*
40. "give" **deh₃t*
41. "heart" **ḱḗr*, **ḱr̥dés* (neuter noun)
42. "become" **b^{h}uh₂t*
43. "man" **h₂nḗr*, **h₂n̥rés* (animate noun)

APPENDIX 2 Sample Lesson Plan

5 min.	**Learning objectives:** • Introduce myself in PIE in at least one of two possible ways • Ask someone what their name is in PIE • Introduce someone else in PIE **Warm-up:** Looking at the following examples of how to say "My name is . . . " in different IE languages, what do you think the word for "name" is in each? Ancient Greek: Ὄνομα μοι . . . (Ónoma moi . . .) Latin: Nomen mihi est . . . Sanskrit: अहम् . . . (aham . . .)मम नाम . . . (mama nāma . . .) Persian: نام من . . . است (naam e man . . . ast)
15 min.	**Communicative practice of PIE as a conlang** (including a review of the previous lessons, if applicable). **Introductions:** Andrew points to self: "Andrew h₁esmi." Andrew points to self, repeats "**Andrew** h₁esmi." Then points to student. "Kʷís h₁esi?"

	Student gives their name. Andrew repeats student's name X to the class: "X $h_1$esti!" In doing so, Andrew also PIE-ifies their name. (Andrew = H_1éndrus) Andrew continues on to the next student (Y). "**H_1éndrus** $h_1$esmi. K^wís $h_1$esi?" and then introduces new student to the class: "Y $h_1$esti!" After a few students have answered, the following dialogue is presented on the board: Student X: " _____ $h_1$esmi. K^wís $h_1$esi?" Student Y: " _____ $h_1$esmi." Students are encouraged to introduce themselves to one another. Andrew calls on one student and points to their neighbor, asking "$K^w$is $h_1$esti?" Students are encouraged to respond with the full sentence. For linguistic support, the following dialogue is put on the board alongside an image that makes it obvious two people are talking about a third person: "K^wís $h_1$esti?" "Jennifer $h_1$esti." After a couple students have been called on, Andrew points to self: "H_1nóh$_3$mn̥ moy H_1éndrus $h_1$esti." (Andrew writes "H_1nóh$_3$mn̥ moy H_1éndrus $h_1$esti." = "H_1éndrus $h_1$esmi." on board) Andrew asks a couple more students "H_1nóh$_3$mn̥ toy k^wid $h_1$esti?" to see if they can produce the longer form as well.
5 min.	**Transition by drawing attention to one linguistic aspect of the communicative exercise above.** Andrew puts the following up on the board and asks students to identify which word they think means "name." H_1nóh$_3$mn̥ moy H_1éndrus $h_1$esti. H_1nóh$_3$mn̥ toy k^wíd $h_1$esti?
10 min.	**Comparison of a single grammatical construction or sound in PIE with the same forms in an attested daughter language** (allowing students through guided tasks to notice similarities or differences and make inferences about the changes that they see in the data presented) Andrew puts the following on the board:

PIE	Ancient Greek
H_1éndrus $h_1$esmi.	Ἔνδρυς εἰμι. (Endrus eimi.)
H_1nóh$_3$mn̥ moy H_1éndrus $h_1$esti.	Ὄνομα μοι Ἔνδρυς ἐστι. (Onoma moy Endrus esti.)
K^wís $h_1$esi?	Τίς εἶ; (Tís eî?)
H_1nóh$_3$mn̥ toy k^wíd $h_1$esti?	Ὄνομα τοι τί ἐστι; (Ónoma toy tí esti?)

	Students are asked to discuss in groups the differences between PIE and Ancient Greek and come up with at least three sound changes. Students then as a class are asked specifically to describe what happens to the PIE /k^{w}/ in Ancient Greek.
10 min.	**Additional data is presented from attested daughter language to allow students to make generalizations and form rules to describe the changes they see.** More data that shows the PIE /k^{w}/ sound in Ancient Greek; students will need in groups to come up with the rules for when /k^{w}/ becomes /p/, /t/, or /k/ based on the environment. Example: wék^{w}os 'voice' > épos; k^{w}ís > tís 'who'; g^{w}owk^{w}ólos > boukólos 'cowherd' Students will also be given data for /g^{w}/ and /g^{wh}/ and will come up with similar rules. Example: g^{w}óws > boũs 'cow', g^{wh}ónos > p^{h}ónos 'murder', etc.
5 min.	**Assess student comprehension thus far by having them apply the rules they have deduced to new data, reconstructing back to PIE.** Students will be given new words in Ancient Greek with the sounds /p/, /t/, and /k/ that they must reconstruct back to PIE.
5 min.	**Lead students to deduce from the descriptive rules the underlying reasons behind the rules (natural classes, assimilation, semantic broadening, etc.).** Students will be led to describe the placement of the sounds in the mouth and which features /k^{w}/, /g^{w}/, and /g^{wh}/ share, as well as how the vowels that affect the environmental changes are similar or dissimilar.
5 min.	**Short discussion of these rules or reasons behind the rules in broader linguistic scope to make connections between IES and modern Linguistics.** Examples of assimilation to nearby vowels in the history of English, such as palatalization in *church*, *child*, *yard*, *witch*, etc.
10 min.	**Concluding task that combines all of the new information learned that day** Students are given a short text in Ancient Greek that includes an introduction. Some of the text has already been reconstructed back into PIE, but students must figure out the rest. They have five minutes to work individually, and then the last five minutes to compare with their neighbors and come to a conclusion.
5 min.	**Review of learning objectives and transition to the next lesson.**