Teaching Case

The Green Apple Approach to Teaching *Privacy*

Yaprak Dalat-Ward
ydalatward@fhsu.edu
Department of Advanced Education Programs
Fort Hays State University
Hays, KS 67601, USA

Li-Jen Lester
lys001@shsu.edu
Computer Science Department
Sam Houston State University
Huntsville, TX 77340, USA

Hook

Privacy and the *GREEN APPLE!*

Abstract

This case demonstrates a five-step activity as a basis for teaching *Privacy* as it relates to *identity attributes* as part of a *Professionalism and Ethics* course of a Computer Science program. The focus of the activity was to bring awareness to *identity attributes* by means of using the GREEN APPLE approach. The significance of the activity was based on the fact that privacy statements could easily be misunderstood and misinterpreted. The activity was designed as five interrelated steps: 1. Exploration: Dissecting the problem; 2. Awareness: Diagnosing *identity attributes*; 3. Self-reflection and Introspection: Recognizing self; 4. Connectivity: Thinking together; and 5. Action: Understanding ethical decision making. Based on the observations of the faculty member and student feedback the case resulted in students being able to develop a model privacy statement made up of brief, precise, and straightforward language while paying attention to the *identity attributes* of the consumers; gaining insight into the essence of *Diversity, Equity, and Inclusion*; and understanding ethical decision making.

Keywords: Diversity, Ethics, Equity, GREEN APPLE, Identity Attributes, Inclusion, Privacy, Professionalism

1. STARTING POINT OF THE ACTIVITY

As digital takes over our entire lives, teaching and learning ethical issues for computer science professionals is not only an imperative but also a legal obligation since ethics "affects not only how we do things but how we think about them, it challenges some of the basic organizing concepts of moral and political philosophy such as property, privacy, the distribution of power, basic liberties, and moral responsibility" (Nissenbaum, 1998, para. 2).

Teaching content as a case is an extremely effective method since students work collaboratively as well as individually, at times engaging in dialogues and discussions, at times asking a "stream of questions" (Ellet, 2007, p. 5).

and at times writing to "persuade the expert reader-all in a limited time" (Ellet, p. 5).

Tackling a real-life problem, in this case, *Privacy*; doing an "accurate causal analysis" of the problem (Ellet, 2007, p. 21); gaining insight; and being able to understand ethical decision making made up the core of this case (hereinafter the activity). The goal of the activity was to introduce the foundation of a unit, *Privacy*, of a Computer Science course entitled *Professionalism and Ethics* (Lester, 2021) and therefore, introduced *identity attributes* which also led to understanding the essence of *Diversity, Equity, and Inclusion* (DEI). This particular activity, however, did not cover the legal aspects of *Privacy*. Furthermore, the limited data collected during and after the unit served as instructional scaffolding and course improvement.

The five-step activity, developed by the faculty member, prepared students to think about the meaning of privacy, *identity attributes*, and to "interrupt the fear that results in discriminatory attitudes and action" (Miller, p. 2) and consider ethical decision making.

The required core course, *Professionalism and Ethics,* for a Computer Science Department at a state research university, was designed, and added to the curriculum not only to meet the internal accreditation requirements, and the Accreditation Board for Engineering and Technology (ABET) Accreditation requirements but also to prepare ethically sound IT professionals (ABET, n.d.).

The course syllabus identified the objective as" to examine the nature, need and value of well-formed ethical constructs within the digital forensics' profession" (Lester, 2021, p. 1). According to the faculty member teaching the *Privacy* unit, particularly as it relates to the comprehension of *identity attributes* and the fundamentals of DEI teachings, had two purposes. First, this approach not only met the internal program requirements regarding "developing ethical reasoning and/or ethical decision making" (Lester, 2021) but was also complementary to the ABET commitment to DEI (n.d.): "ABET staff, volunteers and leadership are committed to the principles of diversity, equity, and inclusion through global leadership in STEM education, incorporating the highest standards of professional integrity, dignity, fairness, justice and respect for everyone" (para.1). Second, understanding the ethical implications of *identity attributes* allowed students to have awareness, a solid foundation of DEI and be able to consider

the consequentialist aspects of their actions when making decisions personally and professionally.

2. THE ACTIVITY PREPARATION

Since prior to immersing into an activity, providing students with the "what" "why" and "how" of the steps of the activity results in more effective learning, more motivation, and more engagement, the faculty member introduced the "what" "why" and "how" of the three essential areas which included: 1. Types of case situations, 2. choice navigation and guidelines, and 3. learning theory and skills.

Types of Case Situations
In teaching a case, starting by introducing different types of case situations (*Problems*, *Decisions*, *Evaluations* and *Rules*) is fundamental as it provides a framework for learners to "help organize analysis" (Ellet, 2007, p. 20).

Teaching by means of a case also requires students to think deeply about the topics involved (Ellet) which is characterized by Marton and Säljö (1976) as an active engagement focusing on "*what* is learned, rather than differences in *how much* is learned" (p. 4), involving learner's "level of processing" and whether "the learner is engaged in *surface-level* or *deep-level* processing" (p. 4)*.

When students analyze a case according to Ellet (2007), students "give it meaning in relation to its key issues….the goal is to come to conclusions congruent with the reality of the case….communicate their thinking effectively" (p. 6). In addition, such cases offer meaningful learning which occurs when learning is active, constructive, intentional, authentic, and cooperative.

Because this particular activity was categorized as a *Problems* case (Ellet, 2007), it involved understanding the notion of *identity attributes* and decision making. It focused on "withholding judgement, curiosity about unfamiliarity and difference…[adopting] to the eyes of an explorer" (Miller, 2021, p. 2). In addition, the case reiterated the importance of "diversity of identities" and "stepping away from euphemism…to get more specific and accurate in our goals, which can lead to more substantive and accurate conversations and strategies" (Bolger, 2020, para. 14).

Choice Navigation and Guidelines
Students were also required to "embark on the complex series of choices" (Duncan, Kim, &

Soman, 2021, pp.100-101) leading to ethical decision making, and therefore, needed a framework: "one practical approach to help individuals navigate complex choice environments is to provide them with guidelines-in particular, a roadmap to help them make....decisions" (Duncan et al., p. 97). Since the goal of a framework is to allow students to "convert a complex goal choice into concrete actions" (Duncan et al., p. 99), these guidelines "provided [sic] *vocabulary* to deal with a particular situation and a set of choice...*expert-driven*, meaning they come from a credible source" (p. 99).

As a starting point, it was also essential to discuss the taxonomy of guidelines (*anchor*, *procedural*, *informational guidelines*) so students would start their learning with a strong foundation. The faculty member explained that this activity would fall under *anchor guidelines* as the purpose of was to "motivate users to take action and get started" (Duncan et al., p. 101).

Furthermore, understanding organizational "specific behavioral tendencies" (Duncan et al., p. 100) or behavioral change challenges, categorized as *compliance*, *switching*, *consumption* and *acceleration*, was also essential prior to the activity since "most organizations were [sic] fundamentally in the business of behavioral change" (Soman, 2021, p. 4).

Learning Theory and Skills
It was also important to explain different learning experiences and what andragogy meant and what the learning theory entailed (Knowles, 1977).

First, since this case dealt with "experiential," "problem-solving," and understanding the "immediate value" (Knowles, 1977, p. 39) of *identity attributes* as well as pathway to DEI, according to the instructor, explaining the adult learning theory had benefits, providing the students with another layer of awareness of the meaning of "experiential," "problem-solving," and understanding the "immediate value" (Knowles, 1977, p. 39) of their learnings.

Second, such activities allow students to understand their positionality and requires additional skills such as self-reflection, critical thinking, synthesis, data driven decision making, engaging in difficult dialogues (dialogic dialogues) and discussions, question formation, causal analysis, being able to collaborate. These skills were introduced by previous activities earlier in the course and made it easier for students to anticipate the expected challenges in this particular unit, *Privacy*.

Third, since the activity involved both individual as well as group work, it was important to emphasize what individual and collective learning entailed: "individual learning is tightly coupled with how the collectively created knowledge evolves. Individuals learn more if a shared understanding is created in the group" (Ley, Seitlinger, Dennerlein, Treasure-Jones, Santos, Lex, & Kowald (2016, para. 3).

Fourth, students were reminded from their previous work how these activities could be productive when engaged in both discussions and dialogues. According to Isaacs (1999) "we both need discussion and dialogue" (p. 45). While "*discussion* is about making a decision…*Dialogue* is about exploring the nature of choice…evoking insights, which is a way of reordering our knowledge-particularly the taken-for-granted assumptions that people bring to the table" (p. 45). Furthermore, "a dialogue not only raises the level of shared thinking it impacts how people act, and in particular, how they because act together" (Isaacs, 1999, p. 22). Majority of the activities in this course required dialogical dialogues or difficult dialogues regarding sensitive topics so prior to this activity, students already knew how to conduct "difficult" conversations and were aware that these conversations were "learning conversations" (Stone, Patton, Heen, & Fisher, 1999, p. 16) not a place to "deliver a message" (p. 16). Since this particular activity also required discussions on sensitive topics such as identity, emotions, feelings, private issues, students were reminded to refrain from making assumptions and work towards openness and information sharing.

3. THE ACTIVITY

The course *Professionalism and Ethics* was a requirement for all Computer Science program students and covered units including *Ethics*, *Intellectual Property,* Privacy, and *Internet of Things*. The teaching of the unit entitled *Privacy* followed the teachings of *Ethics* and *Intellectual Property*.

With 25 undergraduate students, the purpose of the five-step activity served as a starting point for students to gain deeper insights into *identity attributes* and understanding the ethical implications of *Privacy*. The role of the faculty was to provide guidance, direction, explanation of the process as well as act as a facilitator to monitor and guide group discussions.

Summary of the Step-by-Step Activity
While the first step allowed students to recognize and dissect the challenges related to real-like privacy statements, the second step was about the anonymous online GREEN APPLE (Miller, 2021) survey. The acronym GREEN APPLE represented the initials of the following *identity attributes*: "**g**ender identity, **r**eligion, **e**thnicity and race, **e**conomic class/socioeconomic status, **n**ame/family, **a**ge, **p**lace, **p**erception of belonging, and **e**xceptionality" (Miller, p. 3). As part of the third step, students self-reflected on their own survey results and discussed the results with the faculty member which helped them recognize their positionality in relation to different *identity attributes* vis-a vis privacy.

Table 1. Summary of the activity

Summary of the Five-Step Activity		
Step 1. Exploration Dissecting the problem	Students decipher the privacy statements of real businesses	Group work
Step 2. Awareness Diagnosing identity *attributes*	Students individually take the anonymous online survey, GREEN APPLE faculty member discusses the *identity attributes*	Individual and group work faculty member led class discussion
Step 3. Self-reflection and Introspection Recognizing self	Students reflect on their own identities, behavior choices	Individual work
Step 4. Connectivity Thinking together	Students engage in dialogues and discussions, exploring insights, alternatives	Group work
Step 5. Action Understanding ethical decision making	Students consider the moral implications regarding right/wrong and good/bad and create a model privacy label	Individual and group work

The fourth step was to engage in difficult dialogues and discussions with other students regarding their findings. As students had already been practicing dialogical dialogues during the first two units of the course, this step allowed them to explore insights and reorder thoughts (Isaacs, 1999). Each group had assigned their members roles including the role of moderator, note-taker, timekeeper, and material collectors to engage in a discussion format. Once the students gained deeper insights into various perspectives on *identity attributes*, they were able to proceed to the fifth step. Similar to food nutrition facts sheet and considering what is ethically right/wrong; and good/bad, students created a model privacy label made up pf clear text leaving no place for ambiguity and/or misinterpretation. Details of the activity are shown in Table 1.

Student reflections on *identity attributes* became the building block in understanding the essentials of DEI. The authors would like to note that this activity does not claim to teach DEI, but by introducing "**G**ender identity, **R**eligion, **E**thnicity and race, **E**conomic class/socioeconomic status, **N**ame/family, **A**ge, **P**lace, **P**erception of belonging, and **E**xceptionality" (Miller, p. 3), it provides the fundamentals of what DEI entails.

Details of the Step-by-Step Activity
Step 1. Exploration: Dissecting the Problem.
This step required students to work in groups and explore the facts and identify problems related to *Privacy*. Since a real-life proof was needed, the faculty member turned to real-life business privacy statements regarding software, application, apps, and devices of major tech companies leading students to "reasoning and evidence" (Ellet, 2007, p. 8).

The selected official sites as examples for group discussions included Apple, Facebook, Google, and Microsoft. Being exposed to real-life business texts, students were able to carefully review, critique, and analyze as well as to compare and confirm the outcomes of the problem. Connecting to real world problems better prepared them to question what was ethically good and bad; and right and wrong.

At this stage once the statements were shared on the screen, in groups, the students were asked to analyze the language of the statements. The faculty member prepared students to act like qualitative researchers and decipher these statements using linguistic *inquiry* (Guest, MacQueen, & Namey, 2012). Each and every word was analyzed paying attention to key-word-in-context (KWIC) as part of *thematic analysis* (Guest, MacQueen, & Namey). When students reviewed the privacy statements, the following challenges were identified: 1) these texts were lengthy, 2) these texts displayed legal terms which were unclear to lay people; 3) the style of these texts were difficult to understand; and 4) the personal data protection sections and options were difficult to identify.

Once the students identified the problems with the authentic *Privacy* statements defined as "a significant outcome…something important…but we don't know why" (Ellet, 2007, p. 21), they had to make choices, decide, and evaluate "the worth, value, or effectiveness" (p. 23) of appropriate criteria so they could create an ideal format which would assist in the consumers' understanding and precaution.

Step 2. Awareness: Diagnosing Identity Attributes. To be able to create criteria for an ideal format, working individually and in groups, students completed the second step which involved diagnosing their *identity attributes* through an online survey. The survey was based on the acronym GREEN APPLE which was developed to build culturally responsive communities by Donna L. Miller (2021) and represented the following 10 *identity attributes*: **G**ender, **R**eligion, **E**thnicity & **R**ace, **E**conomic Class/Socioeconomic Status, **N**ame/Family, **A**ge, **P**lace (geography, national territory), **P**erception of Belonging, **L**anguage, and **E**xceptionality, whether gifted or challenged (Miller, p. 3).

For this step, first, students were required to work individually to respond to an anonymous online survey called, GREEN APPLE (see Appendix A). The survey analysis and charts were then used individually and anonymously as well as shared and discussed (involving the instructor) in the class to understand the differences and the importance of each attribute.

Using GREEN APPLE allowed students to become aware of issues related to DEI, respecting the privacy of others with an open mindset, and being able to have difficult conversations in a culturally responsive community.

Step 3. Self-reflection and Introspection: Recognizing Self. Regarding the findings of the survey, the faculty member first shared the two definitions of self-reflection. The first was defined by Overgaard (2008): "A sense of self is a collection of schemata regarding one's abilities, traits and attitudes that guides our behaviours, choices and social interactions followed by the definition of *introspection* which is believed to be a reflexive, metacognitive process, attending to or thinking about oneself or what is currently being experienced by oneself" (p. 4953). The second shared definition was by Johnston, Baxter, Wilder, Pipe, Heiserman, and Prigatano (2002): "The accuracy of one's sense of self will impact ability to function effectively in the world" (p. 1808). Once the term was defined, the students were directed to "consciously reflect

on…sense of self….an important aspect of self-awareness" (Johnston, et al., p. 1808). Based on the findings of the individual surveys, students reached an understanding that human identities were fundamental to understand the ethical implications of privacy entailed. These attributes brought awareness to students regarding "respecting privacy of others" with an open mindset.

Step 4. Connectivity: Thinking Together. Once a context was created, students were able to engage in dialogues and discussions. Due to their experience in other unit activities the course covered, they knew how to withhold judgment and due to the sensitivity of the survey, they were instructed to refrain from drawing conclusions that may not be accurate (Argyris, 1990). Students were instructed to be open and were encouraged to exercise curiosity when discussing their findings. These interactions led to a better understanding of diverse identities and the importance of building and sustaining culturally responsive communities.

Step 5. Action: Understanding Ethical Decision Making. As a final step, following the intense dialogues and discussions, the students were asked to implement their learnings. They worked individually as well as in group to select an *Internet of Things* device and create a model privacy label. The privacy label was required to list the privacy attributes which would be protected and/or to be used based on the findings from the GREEN APPLE results. Similar to food nutrition facts sheet and considering what is ethically right/wrong; and good/bad, students created a clear text. All ambiguous phrases were avoided, leaving no room for misunderstanding and/or misinterpretation. This step re-iterated the students' learnings regarding how to interact with diversity, respect others' privacy, and stay open-minded to accept the differences.

4. INSIGHTS

Summary of Data Collected
The goal of collecting data during certain steps of the activity as well as after the activity was for instructional scaffolding; for students to have a deeper understanding of the value of the activity; and for course improvement.

First, the online GREEN APPLE survey data, collected during *Step 2.Awareness: Diagnosing Identity Attributes* provided a detailed picture on student perceptions on *identity attributes*. Presenting the findings of the survey to students during *Step 3. Self-reflection and Introspection:*

Recognizing Self, not only brought awareness to *identity attributes* related to privacy but also served as the foundation for the student discussions, dialogues, paving the way for difficult conversations as part of *Step 4. Connectivity*.

Second, the observations of the faculty member during *Step 5. Action:* served as valuable feedback regarding the implementation of student learnings. Observations revealed that students were able to take their learnings and create successful statements as part of the activity.

Third, upon completing the entire activity, additional data collected were reflections of students which provided a deeper understanding of what students felt.   In addition, these narratives provided positive feedback. Once these reflections were completed, an immediate visual presentation, made up of the most commonly used words in reflections was displayed.   This virtual picture of words resulted in better understanding of the fundamentals of DEI.

The GREEN APPLE Survey Data
Once the students completed *Step 2. Awareness: Diagnosing Identity Attributes* by taking an online survey, their attributes were ranked as indicated in Table 2.

Table 2. Survey findings

Item as the Top 3 Most Private Attribute	
Economic Class/Socioeconomic Status	83%
Religion	48%
Place (geography, national territory)	39%
Exceptionality - whether gifted or challenged	30%
Perception of Belonging	26%
Age	26%
Name/Family	22%
Ethnicity and Race	17%
Gender Identity	9%
Language (discourse community)	0%

The top three ranked attributes were as follows: The "**E**conomic Class/Socioeconomic Statue" (one of the acronyms in GRE**E**N) was the top ranked attribute followed by "**R**eligion" being ranked as second, and "**P**lace (geography, national territory)" being ranked as third.

These findings became the center of *Step 3. Self-reflection and Introspection: Recognizing Self.* The findings brought awareness to *identity attributes* related to privacy and served as the foundation for the student discussions, dialogues as part of *Step 4. Connectivity*. During the

discussions and dialogues many students indicated that they were highly surprised to learn that certain attributes which were considered "private" and "not to be revealed in public" were ranked as top private attributes.

GREEN APPLE Student Reflections
Once the five-step activity was completed, it was important to collect an additional set of textual data by means of student reflections as a follow up. The goal was to gain a deeper understanding of student awareness and learnings regarding fundamentals of DEI as a result of the activity.

Students were asked to review the GREEN APPLE survey findings of the top ranked three attributes including **G**ender, **R**eligion, and **E**thnicity and **R**ace presented as charts. The students were instructed to describe their experience regarding DEI in a minimum of 60 words (see Appendix B).

Based on these reflections, the common points shared by students were similar. The following selected texts represented to overall perceptions:

Student 1: "What I learned about Diversity, Equity, and Inclusion by completing this exercise was that not everyone has the same values about what should be private and what should not. I think that we should learn to accept each other's differences and not view another person differently because of it. In the work industry, you will never fully know what is "too private" of another person, so it is important to avoid asking them questions about these personal matters and above all, *respect them as a person*."

Student 2: "I learned that all people, regardless of their abilities, disabilities, or health care needs, have the right to be respected and appreciated as valuable members of their communities."

Student 3: "Our class' beliefs all differ and certain information is not to be shared and should be kept private while other members may believe the complete opposite. This is the equality and inclusion aspect of the Green Apple exercise."

Rather than a lengthy thematic analysis, it was important to view and share the preliminary visualization of the most commonly used words in the narratives which led to the creation of a visualization by means of "Wordle" (Viégas, Wattenberg, & Feinberg, 2009) as indicated in Figure 1.

As indicated in Figure 1, the most commonly used words included **P**eople, **P**rivate, **E**thnicity, **R**ace,

Gender, **R**eligion…etc. The word "learned" was also noteworthy. Students became more aware of these *identity attributes* and understood what each attribute meant and what ethical decision making entailed.

Figure 1. The most commonly used words

Instructor Observations on Step 5: Action
Through the final step of the activity, *Step 5: Action*, the faculty member observed that the students had no difficulty in creating their own privacy labels by focusing on *identity attributes* while designing the privacy statement of their chosen device for Internet of Things (See Figure 2 and Figure 3).

Figure 2. Privacy Label Example A

In sum, through this activity, the students shared their awareness of *identity attributes* and the foundation of DEI and the importance of accepting and respecting others no matter what GREEN APPLE attributes they would encounter.

Figure 3. Privacy Label Example B

5. RESULTS

The experience of teaching an activity such as this one revealed that students would become aware of their moral obligations and understand the ethical implications of their actions whether in cyberspace or a face-to-face environment. These types of cases empower students to think and act in a way that questions what is ethically good and bad; and right and wrong.

To conclude this case, one student summarized the value of the activity: "This exercise highlighted some key topics that some people may find uncomfortable to disclose and thus should be avoided to maintain a healthy work environment... Diversity is a good thing within people but should not be a factor in any decision. Making a decision from this would be unfair and impartial."

This activity or similar activities which promote understanding of the essentials of DEI and culturally responsive environments can serve as game changer not only for IT students but all students, preparing them for the constantly disrupted global economy.

6. RECOMMENDATIONS

The purpose of this paper was to describe an activity designed to teach *Privacy.* The goal of collecting limited data was to enable students to move through the steps of the activity which eventually, resulted in students' better understanding of the topic *Privacy*.

The data also provided the faculty member with a "deep understanding of both the nature of learning and the conditions in which it is likely to flourish" (Bain, 2004, p. 84). Moreover, "because the methods work in helping students achieve,

students develop faith in their instructors, and that trust becomes its own force" (Bain, p. 85).

Furthermore, the data and student feedback supported course improvement. As a result, it was decided that the following areas would be added to the activity. Step 1: Emphasize DEI (through identity attributes) while linking to the topic of *Privacy*; Step 2: Add a brainstorming activity for students to identify familiar or common privacy attributes; Step 3: Allocate more time on self-reflection so students can gain a deeper understanding of the differences among peers; Step 4: Have the group demonstrate their understanding of diverse identities by writing a group reflection of what they have learned; and Step 5: Follow up with student learnings by using another case study.

This paper shared an experience of a particular class and students at a particular time. To obtain more insight into student perceptions and explain the process of student learnings *dissecting a problem*, the authors recommend that additional textual and numerical data be collected by means of using instruments such as in-depth student interviews, surveys, and/or focus group conversations. The authors also recommend that an inductive analysis such as the applied thematic analysis ([ATA], Guest, MacQueen, & Namey, 2012) be conducted to have a more "descriptive and exploratory orientation" (Guest at al., p. 7).
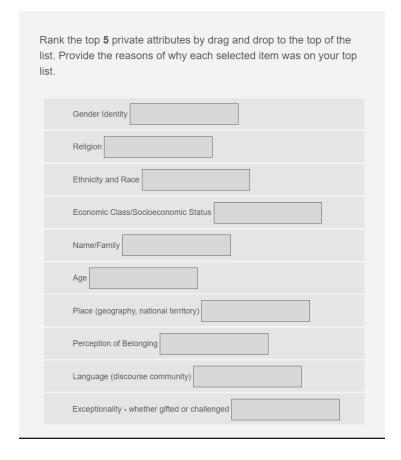
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Appendix A: Respecting Identities: GREEN APPLE Online Survey

Rank the top **5** private attributes by drag and drop to the top of the list. Provide the reasons of why each selected item was on your top list.

Gender Identity

Religion

Ethnicity and Race

Economic Class/Socioeconomic Status

Name/Family

Age

Place (geography, national territory)

Perception of Belonging

Language (discourse community)

Exceptionality - whether gifted or challenged

Appendix B: GREEN APPLE Reflection

Instructions: Regarding our exercise "Respect Identities: GREEN APPLE," you and your peers provided the following data using a scale - 1 as the most private and 10 as the least private. From the examples displayed below share what you learned (a minimum of **60** words) about Diversity, Equity, and Inclusion by completing this exercise.