Hacettepe Üniversitesi Eğitim Fakültesi Dergisi (H. U. Journal of Education) 40: 353-362 [2011]

THE BRIDGE BETWEEN MOTIVATION AND IMPLEMENTATION; AN INSIDE LOOK TO PROFESSIONAL DEVELOPMENT*

MOTİVASYON VE İMPLEMENTASYON ARASINDAKİ KÖPRÜ: HİZMET İÇİ EĞİTİME BİR BAKIŞ

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ABSTRACT: DNA and DNA related technologies have become a part of daily life in the 21st century. In today's world, it is a necessity for science teachers to keep up with current changes in sciences and be able to teach the content in their classrooms. Such needs in consideration, professional development programs aim to help teachers during the transition from learning the content to implementing it in their own classrooms. Implementation is considered an indicator of success of professional development workshops. This study focuses on a DNA Fingerprinting Professional Development Workshop and investigates teachers' motivation to attend the workshop and their implementation intentions and behavior. The purpose of the study was to identify factors influential on attendance and implementation and contribute to behavior prediction models which can be used during the design of professional development programs.

Keywords: professional development, science education, DNA fingerprinting, implementation behavior

ÖZET: DNA ve DNA teknolojilerinin 21. yüzyıl günlük hayatının bir parçası halini aldığı günümüzde, fen ve biyoloji öğretmenlerinin bu konular hakkındaki bilgilerini güncel tutmaları ve bu konuları öğrencilerine öğretebilmeleri büyük önem taşımaktadır. Hizmet içi eğitim programları, öğretmenlere bu süreçte hizmet eden programlardır. Hizmet içi eğitim programlarının başarılı olma göstergelerinden biri, program içeriğinin öğretmenler tarafından sınıf ortamlarına taşınması ve yansımalarının öğrenci başarısında görülmesidir. Bu çalışma, "DNA Parmak İzi" hizmet içi çalıştayına katılan öğretmenlerin çalıştaya katılma nedenlerini ve çalıştay içeriğini uygulamaya koyma (implementasyon) istek ve davranışlarını araştırmaktadır. Çalışmanın amacı öğretmenlerin uygulamaya koyma davranışlarını açıklayan faktörleri belirleyerek başarılı hizmet içi eğitim programlarının oluşturulmasında kullanılabilecek davranış modellerine katkı sağlamaktır.

Anahtar sözcükler: hizmet içi eğitim, DNA parmak izi, fen eğitimi, uygulama davranışı (implementasyon)

1. INTRODUCTION

The 21st century is considered the Age of Biology with milestone progresses such as the completion of the Human Genome Project in 2003 or advancements in stem cell research. The transition of biotechnology from a complex scientific area to an integral part of everyday life is driven by such achievements in molecular biology. The point at which we stand now includes the integration of different applications of DNA technologies to daily life such as; judicial system, food sciences, medicine and even in the field of entertainment. Thus, a general understanding has become a necessity for every individual which can only be achieved by an effective science education.

The changing nature of science creates high expectations for scientists, science educators and every individual in social life. In the 1900s, a major task required by scientists was "to obtain more data to confirm classical theories" (Siebert, 2000). However, in today's world the expectations are much higher. The increasing amount of scientific knowledge is observed to create complexity in the scientific community as well as in education and social life. The twenty-first century's social life requires individuals to be more capable and have a better understanding of sciences to be able to function properly in daily life and to make informed decisions when necessary. In light of the progress in sciences and the influences on society, scientific literacy has been a concern. Champagne (1989)

* Bu makale, "Examining The Effects of a DNA Fingerprinting Workshop on Science Teachers' Professional Development and Student Learning" konulu doktora tezinin bir kısmıdır.

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was one of the educators expressing early concerns due to the fact that high school graduates were unable to solve practical problems in the workplace or make intelligent decisions on science related civic issues.

The role of education is prominent to assure the scientific literacy of individuals who are capable of making informed decisions on science related issues. Teacher quality is as important as the educational policies, curriculum, textbooks and others resources for an effective education and for students to reach expected academic achievement. National Research Council emphasizes the importance of teachers on students' academic achievement in National Science Education Standards (NSES) with the statement of "What students learn is greatly influenced by how they are taught" (NRC, 1996). National Commission on Teaching and America's Future (NCTAF) (1996) also states "what teachers know and can do directly determines what students will learn". Teaching ability and content knowledge are two important elements in teacher quality. Teachers are expected to follow the changes in educational policies, pedagogy and content knowledge. In particular, science teachers are expected to follow and keep up with scientific progress and be able to teach the necessary content in their classrooms. Professional development programs provide teachers with opportunities to keep up with the changes in the field by promoting ongoing teacher education. For this purpose; various educational opportunities are provided to science teachers focusing on science content knowledge, technology or pedagogy. While professional development programs focus on teachers and teacher development, overall expectation is to increase student achievement as a result of changed instructional practices. Therefore, teacher change and implementation of new behaviors by teachers into their teaching environment are proposed as indicators of success for professional development programs.

Inadequate preparation in subject areas and lack of current knowledge on scientific developments has been identified as the need areas of professional development by various studies (Bazler, 1991, Parsad, Lewis, Westat and Greene, 2000). In addition, as stated in NSES "Reforming science education requires substantive changes in how science is taught, which requires equally substantive change in professional development practices at all levels" (NRC, 1996). Subject matter knowledge is an important element in teacher effectiveness. This focus provides a rationale for professional development programs on specific science and mathematics content (Garet et al., 2001).

Professional development programs hold the expectation that teachers adapt to the substantive changes in pedagogical and content knowledge and change their views and teaching strategies accordingly. However, the expectation of change may be a struggle for many teachers. In a study conducted by Yerrick and Hoving (2003), change is characterized as having one foot on the dock and one foot in the boat. The dock represents stability and comfort, where boat is the representation of unstable ground that is uncomfortable. Since teacher change is challenging process, it is very common to see cases where the outcome expectancy of the professional development programs has failed. As Guskey (2000) points out there have been concerns about the success and the effectiveness of such programs due to their shortcomings as reported in research literature. The success of a professional development program is determined by its impact on participants and their classroom behavior. Therefore, how professional development workshops are structured is very important.

Two indicators for the success of professional development programs are reported as teacher change and implementation of new behavior. Observing new practices, getting feedback and peer cooperation are considered to be some of the conditions required for teacher change (Adams, 2000). Prediction of implementation behavior and integration of new material into teaching plays a vital role for the development and success of professional development opportunities in teacher education. According to Ajzen's theory of planned behavior; intention is assumed to be the precurser of behavior but may be limited due to the difficulties in execution. Fishbein and Yzer (2003)'s theory of the Integrative Model of Behavioral Prediction (IMBP) states that "people do not act on their intentions because they lack the skill to perform the behavior, because there are environmental barriers to performing the behavior, or both (p.181). Although, behavior prediction studies mostly focus on health related issues such as HIV prevention, driver behavior and issues in education such as drop-out there are very few studies focusing on implementation behavior of teachers following professional

development programs. Adams (2000) describes implementation behavior as an output of teachers' motivation and skills and environment. According to this framework curriculum implementation is perceived at the individual teacher level. There are two categories of influential factors in the model. At teacher level; teacher's motivation, subject-matter knowledge and teaching skills, level of cooperation policies and teacher networks are identified as the influential factors on teacher's implementation behavior. The second category includes student related factors such as; students' achievement level, maturity and family background (Adams, 2000).

Although there are few research studies available on the topic, behavior prediction holds merit in the professional development of teachers through identifying influential factors on teachers' implementation behavior. A general model may be developed through identification of factors affective on attendance to professional development programs, intention to implement content and actual implementation behavior. Thus, it would be possible to reduce the gap between intention of implementation and actual implementation behavior. Therefore, this study focuses on a DNA Fingerprinting Professional Development Workshop and investigates in-service science teachers' implementation behavior in regards to their motivations to attend the workshop. The purpose is to contribute to the behavior prediction models which can be used by educators and policy makers when designing and providing professional development workshops. This study seeks answers to three research questions: 1) What are the motivations for teachers to attend a DNA Fingerprinting Professional Development Workshop? 2) What are the factors influence teachers' decision to implement the DNA Fingerprinting Workshop in their own classrooms? 3) What kind of strategies do teachers use when they implement the DNA Fingerprinting Workshop in their own classrooms?

2. METHODOLOGY

2.1. Participants

This study was conducted with the participation of teachers who attended a professional development workshop on DNA Fingerprinting. A total of seventy three teachers participated in one of the four DNA Fingerprinting Professional Development Workshops. Four teachers were found to be attending more than one workshop. The participants of the study were from diverse backgrounds and were teaching various subject areas as well as grade levels. Seven teachers identified themselves as working in administrative services but not in the classroom environment, two teachers were teaching high school mathematics, and one teacher identified her content area of teaching as middle school physical education. Out of sixty three teachers, thirty two of them were teaching at middle school grade levels, either multiple content areas such as mathematics, science, and English or teaching special education at multiple content areas. Thirty one high school science teachers also participated in the professional development workshops. Eight of these teachers were teaching AP (Advance Placement) biology and were considered to have the highest possibility of implementing the content of the DNA Fingerprinting Workshop. Four of the participating teachers were able implement the DNA Fingerprinting Workshop in their classrooms. Two of these teachers were females and two were males and their years in teaching were; two, four, nine and twenty years.

2.2. Instruments

During the professional development workshop, attending teachers were asked to fill out a questionnaire investigating participants' demographic information, motivation to attend the workshop and intentions of implementing the workshop in their classrooms. The questionnaire consisted of two sections. First section focused on demographic information and consists of structured items. This section of the questionnaire was adapted from the TIMSS 2003 Teacher Questionnaire which is publicly available online (http://nces.ed.gov/timss). The demographic information focused on the grade level taught, content area taught, years in teaching and educational background. The second part of the questionnaire consisted of four open ended items focusing on teachers' motivation to attend the workshop and their intention of implementing the workshop content in their classrooms.

A DNA Fingerprinting Follow-Up Teacher Questionnaire was also used for the purpose of data collection after the DNA Fingerprinting professional development workshops were completed. Once the professional development workshop was completed teachers should have a more realistic intention of implementation. Therefore; this questionnaire attempted to explore participant teachers' intentions to implement the workshop.

As a third method of data collection individual interviews were conducted with the volunteering teachers. Interviews are reported to be an integral part of most social research (Breakwell, 2000, p. 239). The interviews were semi-structured, conducted face to face and were tape recorded with the permission of the participants. Interviews took place during the second nine weeks of the school year. Since the science content on DNA was included in the second nine weeks of the science curriculum, the interview timeline was determined accordingly. Thus, teachers would have enough time to implement the workshop content if they decided to do so. Teachers who implemented the workshop content were also observed by the researcher in terms of implementation style.

2.3. DNA Fingerprinting Workshop

The DNA Fingerprinting Workshop was offered as a daylong professional development workshop. Essential content knowledge on DNA and molecular genetics as well as necessary skills and hands on experience were included in the workshop. The workshop was developed by a university faculty member in the molecular genetics department at a large Midwestern State University in the United States. The content of the workshop was developed with the cooperation of a large Midwestern public school district in the same city and it takes the state and district standards into consideration. The workshop focuses on DNA Fingerprinting and its daily life applications and is aligned with the grade ten biology curriculum. The workshop was originally designed to target grade 10 students. The content of the workshop is built around a mock crime where participants are expected to act like forensic scientists to solve it. Later, the workshop was redesigned as a professional development workshop aiming to provide science teachers with the necessary knowledge and skills to be able to implement the DNA Fingerprinting Workshop in their own classrooms. The implementation procedure was designed to be a collaborative partnership model where equipment and perishable items, necessary to conduct the DNA Fingerprinting Workshop, were provided by the university.

2.4. Data Analysis

The follow-up questionnaire was sent out to participant teachers through US mail. Two reminders were also sent out to teachers a week apart. Out of seventy-three questionnaires that were sent out, three of them were undeliverable. A total of seventeen teachers returned the survey. The return rate was calculated based on guidelines defined by the American Association for Public Opinion Research (AAPOR). The maximum response rate was calculates as 24.286% excluding undeliverable mail questionnaires.

The data collected through interviews were transcribed by the researcher. Both data from the questionnaires and interviews were coded and categorized. The emerging categories and themes were analyzed to identify the motivational influences of attendance and implementation behavior of teachers.

3. FINDINGS

The DNA Fingerprinting Workshop was developed with the consideration of a particular content of the science curriculum. Therefore, the general expectation of target population attending the workshop was the teachers who teach or have the potential to teach this specific content in their own classrooms. Especially, attendance of teachers who are teaching high school biology or AP biology was expected. The analysis of the demographic data of the teachers who attended the DNA Fingerprinting Professional Development Workshop showed a considerable diversity in terms of grade level taught as well as content specialties among participants. This was an unanticipated outcome due to the specific content focus of the DNA Fingerprinting Professional Development Workshop. Out of

seventy three teachers who participated in the professional development workshops, ten teachers identified themselves as working in administrative services or teaching content area such as mathematics or physical education. These teachers were considered to have no potential to implement the workshop in their own classroom environments. Middle school teachers were also considered to be less likely to implement the DNA Fingerprinting Workshop in their classrooms in comparison to high school science teachers due to grade level and content curriculum constraints. Participating high school teachers were most likely to implement the DNA Fingerprinting Workshop within their classrooms. Eight of these teachers were teaching AP biology at the time of this study.

3.1. Motivation to Attend the Workshop

Behavior prediction theories consider intention as the antecedent of behavior. In the case of this study, the role of motivation to attend the workshop was also investigated as a part of the implementation behavior. For this purpose; the questionnaires and interviews were used to ascertain teachers' motivation to attend the professional development workshop. Based on the teachers' responses; four main categories of motivational reasons for attendance were identified; (1) content knowledge; (2) HQT (highly qualified teacher) requirements; (3) opportunity, and (4) interesting topic.

Current educational policies were identified as one of the driving motivational force for many teachers to attend the workshop. Effective as of 2002, No Child Left Behind Act (NCLB) requires all teachers to be highly qualified and competent in the subject-matter areas they teach: English, language arts, reading, science, mathematics, arts, foreign language, government and civics, history, economics and geography. Personal communications with participants, interviews and questionnaire responses suggest that the DNA Fingerprinting Workshop was an opportunity for teachers, who were in need for credit hours, to meet the HQT requirements. A total of nine teachers identified HQT as their motivation to attend the professional development workshop. Some of the teacher comments were as follows;

"Public school's professional development day. I am using this seminar to earn credit for NCBL; special educ-Highly qualified teacher certification." (Teacher 4)

"To fulfill Professional development requirement. Last minute class sign-up left me to choose this class because it sounded very interesting…" (Teacher 32)

"To get credits to apply to Highly Qualified and …" (Teacher 17)

"Spec. Ed. Highly Qualified" (Teacher 53)

As seen from the comments, the teachers' only focus was on completing HQT requirements. The content nature of the professional development workshop or future possibility of implementation was not the motivational influence on their attendance.

The second most often expressed motivational factor for attending the workshop was to gain needed content knowledge. The positive correlation between teachers' content knowledge and students' academic achievement has been reported through various research studies (Sanders and Rivers, 1996; NCTAF, 1996; Monk 1994). During this study the need to promote increased content knowledge related to DNA and molecular biology was emphasized by teachers as well. A total of nineteen teachers identified the opportunity to gain needed content knowledge as their motivation to attend the professional development workshop. This emphasis on content knowledge was conspicuous in two dimensions. While the majority of teachers were identifying self knowledge and their need to increase it, a few teachers also identified their students' content knowledge needs as their motivation to attend the professional development workshop. However, many of their reasons seemed less focused in terms of future goals and more focused on seeing the workshop as an option with potential. AP teachers reported specific goals in mind as their motivation to attend the workshop. They were expected to teach the DNA Fingerprinting Workshop content in their tenth grade classrooms and had a better idea of the workshop content. Therefore, the need to learn the specific content and improve content knowledge as well as the laboratory skills were identified as their motivation.

Teacher 13 is an AP teacher and she had implemented the DNA Fingerprinting experiment with her students in the past, but reported having experienced problems with the set up and outcome of the experiment. Her reasoning of motivation was as follows.

"Because I was an AP biology teacher just to get better knowledge myself on how they worked and how they should run and any short cuts I can learn through the procedures… the most difficult part for me was the general set up, not knowing the equipment as well, not knowing if there is shortcut, I was overly cautious, took too much time setting stuff up. I mean really once you know what you are doing everything is like boom boom boom. Everything was too time consuming and I was double checking myself too much (Teacher 13).

Teacher 41 has been a biology teacher for 20 years and his motivation to attend the professional development was;

"I feel like its technology and its biology that my students need to know and I'm just not I don't feel coming out of college in mid 80's we weren't doing that so I'm not prepared ...I just don't feel like I have the experience so .." (Teacher 41).

Although, the DNA Fingerprinting Workshop was not a part of the curriculum for mainstream grade 10 students, teachers who are teaching at these grade levels, including, special education teachers, identified their motivation to attend the workshop to learn something new and possibly enhance instruction within their own classroom with statements such as; ..

"Gain ideas to use in my 8th grade science class" (Teacher 18, middle school)

"Hopefully to utilize this in my 8th grade health class" (Teacher 68, middle school).

".. interested in forensics to provide more updated info to students.." (Teacher 70).

For some teachers the sole reason to attend this particular workshop was the interesting title of the workshop. Among various choices of professional development workshops available to participate, this particular workshop sounded more interesting. These teachers did not present any particular goal for future.

3.1. Implementation Behavior

A total of seventeen teachers responded to the DNA Fingerprinting Follow-up Teacher Questionnaire. Among these teachers eight of them indicated an intention to implement the DNA Fingerprinting Workshop. However, only four of these teachers were able to implement the workshop. Three of these teachers were teaching AP biology, while one mainstream teacher was teaching middle school mathematics and science. Several reasons were identified as the rationale for either implementing or not implementing the DNA Fingerprinting Workshop.

Teacher 70 was a unique case among the teachers who indicated an intention to implement the workshop. Since he was working in the juvenile correctional system he was prohibited from using glassware or similar laboratory equipment and was unable to facilitate DNA Fingerprinting Workshop as it was presented. He explored other possibilities rather than using the experiment materials and indicated an interest in conducting the paper - pencil version of the workshop.

For teachers who did not implement the workshop in their classrooms, the main reasons identified through the analysis were; the cost of experiment, student maturity level and teacher's content knowledge. The cost of the experiment was identified as a reason for not implementing the workshop. Although the equipment and consumable items were available through university without the expectation of replacement or payment, some of teachers were still concerned with the cost issue and identified it as a factor influencing their choice of not implementing the workshop. For some teachers students' level of maturity and fear of students damaging the equipment was also identified as an issue related to the cost prohibiting them from implementing the workshop. They stated that they

would only do the DNA fingerprinting workshop with the kids they trusted. Thus, their possibility of implementing the workshop was low. One of the participant's comments were as follows;

> "I would be afraid to do it unless because the materials involved seem very expensive so I only do it with the kids I trust. Because unfortunately I've been in several situations where for whatever reasons the students just weren't disciplined enough to be trusted with lab materials and they would break them and steal them. I mean I've had it all happen to me before. I'd make sure number one I trusted the kids" (Teacher 64, teaches in middle school).

In terms of content knowledge, regardless their grade level responsibilities or educational backgrounds teachers expressed concerns regarding their depth of knowledge and emphasized the need of support for future implementations. Even teachers who consider themselves knowledgeable on the content stated self-efficacy issues in regard to the preparation phase of the workshop and necessary skills required.

Eight teachers indicated an interest in implementing the workshop content in their classrooms. However, only four teachers were able to actually implement the DNA Fingerprinting Workshop during the second nine weeks of the school year following the professional development workshops. Three of these teachers were teaching AP biology and one teacher was teaching mainstream middle school mathematics and science at the time of the study. These teachers were observed by the researcher for the purpose of identifying teaching strategies used during the implementation. All four teachers chose to use the instructional materials prepared by the workshop developers and were provided with the equipment for the experiment per their request. Teachers' instructional styles were observed to have a mimicking behavior. The comments and examples they used during the instruction were same or similar to what and how they were taught during the DNA Fingerprinting Professional Development Workshop. This mimicking behavior may be a way to overcome the difficulties faced during implementation and identified to be related with teacher's content knowledge. Providing teachers with structured lesson plans and instructional strategies may be useful for implementation especially for content and skill intense science topics. However, further research is necessary to reach any conclusion on the matter.

4. DISCUSSION

With the increasing importance of biology in daily life and the necessity for citizens' basic understanding of it; teachers' need to keep up with the current scientific content knowledge is more prominent than ever. This can be assured through professional development programs. Although the results of this study are particular to the participants of this study, they would likely to be applicable to other professional development workshops focusing on intensive scientific content knowledge. During this study the actual outcome of implementation behavior was different than the outcome expectation of the DNA Fingerprinting Professional Development Workshop at the beginning of the study. The results suggest that in terms of attendance to a workshop; any possibility of mismatch between the targeted audience of the workshop and the actual audience should be taken into consideration during the development of a workshop. In the case of the DNA Fingerprinting Workshop, the targeted audience was the science teachers with the potential for implementing the DNA Fingerprinting Workshop. However, demographic data showed that the actual audience of the workshop was represented by a variety of subject areas taught and grade levels. In addition some of the participants did not have the possibility of implementing the workshop in their classrooms from the onset. Providing teachers with examples of implementation possibilities of the content for different grade levels would increase the benefits of such professional development workshops.

Current educational policies were found to be one of the influential factors on teachers' motivation to attend the professional development workshop. However, this factor was also found to be a limitation on implementation in the case of DNA Fingerprinting Workshop. Most of the teachers attending the workshop were trying to complete HQT requirements and had little or no possibility of

implementation. The majority of the teachers identified their need to improve their own science content knowledge and skills to be the main motivation for attending the workshop. Teachers' lack of content knowledge and the need for professional development programs focusing on mathematics and science content have been noted in many studies (Garet et al., 2001, Kennedy, 1998). The expressed need to improve the content knowledge as being one of the motivational influences for teachers to attend the workshop indicates awareness among teachers that they lack adequate content knowledge related to a key topic in biology specifically DNA. However, the content knowledge was also identified to have a negative impact on implementation behavior. It is found that teachers were reluctant and less likely to implement the content after a lapse of time since they feel that they have to refresh their knowledge and skills related to the content and the procedures. Regarding implementation behavior, the major finding of this study is that the desired outcome, implementation behavior, is not likely to happen in most cases. Existence of certain content in the curriculum such as DNA Fingerprinting is not enough itself to guarantee implementation behavior. Other factors need to be met for implementation behavior to occur including; teacher's belief that their students are mature enough to handle such learning environments, teacher's content knowledge and skills and confidence in his/her ability.

This study focused on the motivation of attendance and implementation behavior for the purpose of contributing to the development of professional development programs. Some of the participating teachers did not have the potential to implement the workshop. However, it may not necessarily mean that their participation was not beneficial. They could at least gain experience with the content by attending such workshops and this experience may influence their classroom practices. The extent to which this potential outcome was realized was not measured, but warrants further study. To address the issue of need to refresh the content knowledge and skills related to the content and procedures; two possible approaches can be proposed to eliminate this issue. Refresher workshops can be offered on the content to increase teachers' knowledge, skills and self confidence or teachers can be provided with resources they can refer to outside of the professional development opportunities. The difficult areas of the workshop can be identified as the content knowledge and the laboratory procedures. Developing a short video focusing on the content and the procedures, as well as providing lecture materials to teachers, may provide the needed support and encouragement for implemantation. This approach would also address the ongoing content knowledge difficulties of teachers by allowing repeated examination of resources as needed. Thus the gap between intention and implementation may be closed.

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Genişletilmiş Özet

21. yüzyıl, insan genome projesi ve kök hücre çalışmaları gibi ilerlemeler nedeniyle biyoloji çağı olarak nitelendirilmektedir. Günümüzde DNA ve DNA teknolojileri ile ilgili konular günlük hayatımızın bir parçası halini almıştır. Mahkemelerde delil olarak kabul edilen DNA, aynı zamanda gıda sektöründe genetiği değiştirilmiş organizmalar ile gündemde kalmakta, hatta bazı televizyon dizilerinin ana temasını teşkil etmektedir. Toplumun tüm bireyleri için genel bir biyoloji anlayışı bu çerçevede zorunlu hale gelmiştir.

1900'lü yıllarda bilim insanlarından genel beklenti, klasik teorilerin doğrulanması için daha fazla veri toplanması iken 2000'li yıllarda günlük yaşamda bireylerden beklenen bunun çok daha üzerindedir. 21. yüzyıl sosyal hayatı, bireylerin etkin ve doğru kararlar verebilmesi için bilimsel konularda daha iyi bir anlayışa sahip olmalarını gerektirmektedir. Bilimsel okuryazarlığın tartışıldığı böyle bir ortamda etkin bir fen eğitimi için öğretmenlerin rolü yadsınamaz. Öğretmen kalitesi söz konusu olduğunda, öğretim becerisi ve konu alan bilgisi tanımlanan iki önemli faktördür. Öğretmenlerin değişen alan bilgisini takip etmeleri ve öğretim süreçlerine uygulayabilmeleri beklentisi doğrultusunda hazırlanan hizmet içi eğitim programları, öğretmenlere mesleki gelişim imkanı sağlamaktadır. Öğretmenlerin hizmet içi eğitimleri kapsamında edindikleri yeni bilgileri öğretim süreçlerine dahil edebilmeleri ve bunun sonucu olarak öğrenci başarısının artması, mesleki gelişim programlarının başarısı açısından bir gösterge olarak kabul edilmektedir. Fakat yapılan çalışmalar birçok mesleki gelişim programının sonuç beklentisi açısından başarısız olduğunu göstermektedir. Bu nedenle mesleki gelişime yönelik hizmet içi programlarının nasıl yapılandırıldığı büyük önem taşımaktadır. Davranış tahmini modellerinin program oluşturma sürecinde kullanımı hizmet içi proglamların sonuç beklentisini olumlu destekleyebilecek niteliktedir. Davranış tahmini üzerine oluşturulan modeller genel olarak HIV engellenmesi gibi tıp alanlarında, sürücü davranışlarının belirlenmesinde ve öğrencilerin okulu bırakma gibi davranışlarını incelemede kullanılmasına rağmen öğretmenlerin mesleki gelişim programlarına katılım sonrası davranışlarını ve nedenlerini araştırma konusunda da potansiyele sahiptir. Bu çalışmada, bir "DNA Parmak İzi" mesleki gelişim çalıştayına katılan öğretmenlerin çalıştaya katılma motivasyonları ve çalıştay sonrası uygulama eğilim ve davranışları incelenmiştir. Bu çalışmada amaç, elde edilen verilerle, hizmet içi eğitim programlarının oluşturulmasında kullanılabilecek ve öğretmenlerin uygulama (implementasyon) davranışını destekleyecek modellere katkı sağlamaktır.

Yetmişüç öğretmen DNA Parmak İzi Çalıştayına katılmıştır. Çalışma kapsamında veri toplama araçları olarak anket, yüz yüze ve yarı yapılandırılmış görüşme ve gözlem kullanılmıştır. Toplanan veriler kodlanmış ve doküman analizi tekniği kullanarak analiz edilmiştir. Demografik veriler katılımcı öğretmenlerin çok farklı sınıf seviyelerinde ve farklı konu alanlarında öğretmenlik yaptıklarını göstermiştir. Yedi öğretmen idareci olarak çalıştıklarını ve ders vermediklerini belirtmişlerdir. İki öğretmen lisede matematik öğretmenidir. Bir öğretmen ise ortaokul beden eğitimi öğretmeni olduğunu belirtmiştir. Otuz iki öğretmen ortaokul seviyesinde, biri biyoloji olmak üzere birden fazla konu alanı öğretmektedirler. Çalıştaya katılan otuz bir lise öğretmeninden sekizi üst seviye biyoloji dersi verdiklerini belirtmişlerdir. Öğretmenlerin bu kadar çeşitli sınıf seviyesi ve konu alan dağılımı göstermeleri, çalıştayın odaklandığı konu nedeniyle beklenmedik bir durumdur. "DNA Parmak İzi" çalıştayı 10. sınıf biyoloji programını esas alarak hazırlanmış ve bu konuyu sınıflarında öğretme potansiyeli olan öğretmenleri hedeflemiştir. Demografik veriler ise bu beklentinin dışında bir katılımcı kitlesi olduğunu ve bazı katılımcıların çalıştay içeriğini uygulamaya koyma ihtimallerinin olmadığını göstermektedir. Öğretmenlerin "DNA Parmak İzi" çalıştayına katılılımında etkin olan dört

temel motivasyon kaynağı tespit edilmiştir. Dönemin eğitim politikalarından biri olan nitelikli öğretmen olma koşullarını yerine getirme isteği, belirlenen ilk etkendir. Nitelikli öğretmen koşulları, "DNA Parmak İzi" çalıştay konusunu kendi sınıfında uygulama şansı olmayan birçok öğretmenin bu çalıştaya katılmasına neden olmuştur. Bu durum aynı zamanda demografik çeşitliliğin nedenini de açıklamakta ve uygulama söz konusu olduğunda bir engel teşkil etmektedir. Konu alan bilgisi, en çok vurgulanan motivasyon sebeplerinden biridir. Öğretmenler gerek kendi gerekse öğrencilerinin alan bilgisini arttırma ihtiyacını çalıştaya katılma sebepleri arasında göstermişlerdir. Çalıştay konusunun ilginç olması ve bir fırsat teşkil etmesi motivasyon kaynağı olarak belirlenen diğer etkenlerdir. Çalıştay sonunda sadece sekiz öğretmen "DNA Parmak İzi" çalıştayını sınıflarında uygulamayı planladıklarını belirtmişlerdir. Bu öğretmenler arasından dördü sınıflarında "DNA Parmak İzi" çalıştayını uygulamışlardır. Dört öğretmenden üçü üst seviye biyoloji dersi vermektedir, biri ise ortaokul seviyesinde fen ve matematik alanlarında öğretmenlik yapmaktadır. Çalıştay içeriğini sınıfta uygulamayan öğretmenlerin belirttikleri nedenlerin başında konu alan bilgilerine ve laboratuvar becerilerine güvenmeme yer almaktadır. İkinci neden olarak deney materyallerinin çok pahalı olması, öğrencilerin bu cihazları kullanacak kadar olgun olmadıkları ve öğrencilere güvenmedikleri fikri yer almaktadır.

Bu çalışmada öne çıkan ilk bulgu, DNA Parmak İzi mesleki gelişim programında hedeflenen öğretmen kitlesi ile katılımcıların demografik olarak örtüşmemesidir. Beklenenin aksine çalıştay içeriğini sınıflarında uygulama ihtimali düşük olan veya uygulama ihtimali olmayan öğretmenlerin de çalıştaya katıldığı tespit edilmiştir. Farklı sınıf seviyelerinde öğretmenlik yapan öğretmenlerin DNA Parmak İzi Çalıştayına katılmalarındaki en önemli motivasyon kaynağı öğretmen kalitesine yönelik eğitim politikalarıdır. Katılımcıların sınıf seviye farklılıkları ve hedeflenen kitleden olmayışları uygulama davranışlarında olumsuz bir etken olarak değerlendirilmesine rağmen çalıştayın sözü geçen öğretmenler üzerindeki etkilerinin daha detaylı incelenmesi ve öğretmenlik süreçleri üzerindeki etkilerinin araştırılması gerekmektedir. Farklı sınıf seviyelerine yönelik uygulama örneklerinin ve alternatiflerinin öğretmenlere sunulması katılımcıların uygulama sürecinde yaşadıkları çekingenliği veya olumsuzlukları ortadan kaldırmada faydalı olabilir. Özellikle DNA gibi konu alanına yönelik hizmet içi eğitimlerde öğretmenlerin konu alan bilgi ve becerilerinin hizmet içi eğitim programlarına katılırken motive edici, uygulama sürecinde ise engelleyici bir nitelik taşıdığı gözlenmiştir. Hizmet içi eğitimler sonrası kullanılabilecek konu alan bilgisi ve becerilerini hatırlatıcı ek çalıştay veya video gibi destekleyici materyallerin oluşturulması öğretmenlerin uygulama davranışlarını pozitif yönde etkileyebilir.