Proyecto Uno, Dos, Uno, Dos: Parents Helping Their Kindergarteners with Patterning

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Abstract

This project is a website that provides parents with the enrichment tools needed to help their kindergarteners with mathematics. Specifically, it provides parents with patterning activities and lessons that can be done in the home. The website is designed in Spanish for Spanish-speaking parents and students. The website also provides a strong connection between the home and the classroom because student learning is being reinforced at home. It provides access to computers and to the Internet to our limited-English proficient families. It is an essential technological resource that is easy to use and navigate. By creating this Spanish math website, I hope to move one step closer in bridging the technological gap and a language barrier.
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Chapter One

The Importance of Constructivist Learning

I hear and I forget,
I see and I remember,
I do and I understand.
-Confucius

This is a very famous quote that has been used throughout the field of education. If we simply tell students how to solve a particular problem, chances are they won’t recall how to do it at a later time. They might not even learn the concept we are trying to teach them. If we show them how we, as teachers, would come to a particular solution, students may not have a clear understanding. But if we let them take responsibility for their own learning by giving them opportunities to explore and investigate, then they are more likely to identify with and comprehend a particular concept.

All students have different learning styles, and as teachers we should try to meet their individual needs. We try our best to explain and to teach new ideas using a variety of methods and resources such as realia, total physical response (TPR), or music. Sometimes, though, we find ourselves giving our students the answers instead of letting them discover them on their own. Perhaps we want to hurry to the next step and do not want to waste too much time on a particular concept, or maybe we’re just used to teaching this way and moving on.

Constructivism is a theory of learning that helps to explain the importance of self-exploration and self-discovery. A constructivist classroom is one in which students use previous experiences and prior knowledge to learn new concepts.
More specifically, teachers base their instructional practices on what students already know and then build on that. Also, the teacher serves more as facilitator, rather than the authority, and students are more actively engaged and required to formulate their own conclusions. Theoretical practices based on constructivism positively influence learning because children construct their own knowledge in relation to what they already know and are familiar with.

_constructivism in my own classroom_

In my kindergarten classroom, mathematics is a subject that my students enjoy very much. They are especially involved when it comes to math centers. The math tubs, which include tangram puzzles, blocks, unifix cubes, and bear counters, are definitely their favorite. When they are engaged with the tubs they aren't simply playing and tossing the contents around. There seems to be a purpose for their actions. I have observed them building different things and then comparing their creations with each other. Sometimes they see how high they can construct a tower. Others count to see who has more bears. Some see who can finish the first tangram puzzle. And then there are those who make simple repeating patterns using unifix cubes or bears. The patterning, though, doesn't go beyond an ABAB pattern. This is a basic pattern that uses two attributes that alternate. An example with colors is red, blue, red, blue, red, blue.

Patterning is a very important part of mathematics, especially in the primary grades. Patterning sets a foundation for many other aspects of learning, like sorting, classifying, problem solving, and algebra. Indeed, a definition often used for “mathematics” is “the science of patterns.” In kindergarten, patterning
starts off as simple ABAB or AABB repeated patterns, but this progresses to
more complicated repeating patterns once students understand the concept.
They also continue patterns, create their own patterns, and translate patterns
from one modality (e.g., colors) to another (e.g., sounds or shapes).

Parent and student learning

Parents are a critical part of student's learning. They can play a major role
in the successes of their child. For example, I utilize my parents for a variety of
tasks in the classroom. Most of the parents that volunteer in my classroom want
to help so that they know how and in what areas they can help their child at
home. Because parents are a valuable resource for my kindergarten classroom
and their child's learning, I would like to provide them with a specific tool that
would be of benefit for them and for their children. Specifically, the tool needs to
be a resource that is designed especially for Spanish speaking parents.

Constructivist Website for Parents

As a teacher of English language learners, it is very important that my
students' learning be reinforced in the home. Parents and students need to
understand that there should be a strong connection between home and school
no matter what language is spoken. If parents understand the concepts that are
being taught in the classroom, this home-school link will be stronger. Since my
student and parent population have Spanish as the dominant or only language
spoken in the home, I have developed a website in Spanish that consists of
lessons, activities, and games related to patterning that are relevant to my age
level.
I created a website for parents that consisted of a patterning curriculum which followed the constructivist model. I wanted to give my parents the constructivist tools so that they would be able to enrich their children's mathematical understanding.

By creating this project, I had certain goals that I wanted to achieve. First of all, I wanted to make parents aware of the dynamics of the constructivist classroom and how it pertained to the mathematics curriculum in kindergarten, particularly patterning. Second, I wanted to give them exposure to the computer and Internet. Even though this particular website only requires accessing and retrieving the contents, they will still gain some experience using technology. This is an advantage for this project, since most of my parents have limited technological skills. Next, I also hoped that this resource would make my parents feel more comfortable in helping their children since the website was created in a language that they understand, Spanish. Finally, since Spanish math resources are limited on the Internet and for the computer, my goal was to move one step closer in bridging that technological gap.

Overall, the website and its contents were designed to be an effective tool to facilitate activities that parents and students could actively engage in together. I want them to be able to do and understand, to see and to remember, and to hear and not forget.
Chapter Two

Literature Review

The Constructivist Classroom

If you were to walk into a traditional classroom, you would probably see the teacher standing in front of the class either lecturing or teaching students how to perform a particular task. The students would, hopefully, be listening respectfully or pretending to be listening. Most of us have experienced traditional instruction that was teacher-centered, fact-based, or required considerable drill and practice (Windschitl, 1999).

Unfortunately, this type of instruction doesn’t allow for much creativity. There isn’t any flexibility in the classroom or in students’ learning. Students don’t have too many choices in what they will learn. Furthermore, such instruction does not seem to recognize that our children learn in different ways and at different times. So why do so many teachers still insist upon showing students the “how to” instead of allowing them to make their own discoveries?

A constructivist classroom looks quite different from the traditional class described above. That is, if you were to walk into a constructivist environment, you won’t see silent students sitting in rows, which is what most people believe to be the optimal learning environment. In a constructivist setting, you will see lots of interaction and discussions. Students might be dialoguing with one another or with the teacher. The teacher is more of a “guide on the side.” Basically, the teacher is not lecturing in front of the classroom. She is guiding students in their learning. The teacher isn’t the primary source of correct answers, but
encourages students to attempt their own inquiries. Because constructivism is premised on the belief that learners actively create, interpret, and reorganize knowledge in individual ways (Windschitl, 1999), children are provided opportunities to learn in a way that they understand and at their own pace. Furthermore, the constructivist classroom consists of problem-based learning, inquiry activities, dialogs with peers, exposure to multiple sources of information, and opportunities for students to demonstrate their understanding in a variety of ways (Windschitl, 1999). These learning activities are important because, "As educators, we have great control over what we teach, but far less control over what students learn." (Brooks & Brooks 1999)

The Kindergarten Constructivist Classroom

Organizing a constructivist classroom is very hard work for the teacher and requires rigorous intellectual commitment and perseverance on the part of students (Brooks & Brooks, 1999). In kindergarten there are many four and five year olds that have never been to school. Thus, the whole idea of "school" is new to them. They need guidance and structure at the beginning of their educational careers. For these students, following a constructivist framework in kindergarten is difficult, but it can be done. The teacher needs to set a foundation for these five-year-olds. Students need modeling and scenarios, so that they are able to observe situations and can deal with them accordingly. Brainstorming solutions for two students who are having a conflict is one example. Making a list of student expectations in the classroom is also very
helpful in guiding kindergarteners. Here is how I prepare my students for a constructivist learning environment.

We start off at the beginning part of the school year by helping students learn about classroom procedures. We brainstorm ideas that are expected from each student. Basically, the students themselves come up with rules that we are all expected to follow. I simply ask questions or create scenarios for them to think about. We also have many class meetings to discuss problems that arise and possible solutions for the problems. Class meetings to discuss common problems are much better than the imposition of ready-made rules, because children have the chance to think about individual problems and how they affect them. When the group comes up with logical solutions, sociomoral development as well as their development of logic is facilitated (Kamii, 1999). Furthermore, such practices lead to greater autonomy.

The essence of autonomy is that children become able to make decisions for themselves (Kamii, 1982). This is not the same as complete freedom. Students need to know how to make the right choices. “Autonomy means taking relevant factors into account in deciding what the best course of action might be for all concerned.” (Kamii, 1982, p.57) Kindergarteners need lots of help in this area. Their moral development can still be egocentric.

After many class meetings and brainstorming sessions, kindergarteners may be given more freedom in the classroom. For example, they could be afforded opportunities to choose where to sit for the day, select their own buddy, or choose which centers they wish to participate in.
Constructivist Math

Autonomy is also incorporated into the academic realm of education. In math, for example, the best way for children to understand arithmetic is to minimize direct instruction and introduce math games (Kamii, 1982). In games, children exchange points of view with other players. There is dialogue and children are exposed to a variety of solutions to a particular problem. “This way of learning is much more active and conducive to the development of autonomy than worksheets.” (Kamii, 1982, p. 58)

Constructivist mathematics has been in schools for many years now. Literature on the subject is also vast. Most of the materials and books that I read on the subject all agreed that using constructivism to teach math is the best way to help students understand the underlying concepts. Conceptual learning is becoming ever more crucial in today’s society. Students need, not only to get the right answer, but also to know how and why they arrived at that solution. Learning rules and procedures is something that was very important for the industrial era. In today’s technological era, memorizing formulas isn’t necessary. With the advancement in technology, procedural learning can be taken care of by the computer or, for arithmetic, by the calculator.

The idea of constructivist math ties in Piaget’s theory of Constructivism. Piaget’s theory explains that children acquire number concepts through experience and in interacting with the environment (Kamii, 1999). In teaching constructivist math, a teacher uses open-ended questions and does not emphasize right answers. Kamii (1999) also discourages the use of textbooks in
the classroom because students are simply encouraged to produce correct answers and not reason about the process.

Constructivist Math in Kindergarten

The reason I focused on kindergarten math and, more specifically, patterning is that students have not yet had too much experience with algorithms and textbooks. Introducing algorithms to kindergarteners can actually be harmful because they encourage children to give up their own thinking (Kamii & Dominick, 1990). If children are given a rule to solve a particular problem, then they are discouraged from trying to find their own way. They know that by using the "teacher's way" they can get the right answer. The setback, of course, is that they won't understand the process. Kamii and Dominick's (1990) article, The Harmful Effects of Algorithms, explains that children in the primary grades should be able to invent their own arithmetic without the instruction they receive from textbooks and workbooks.

Patterning

A pattern is a regular arrangement of objects, numbers, or shapes (Copley, 2000). In the patterning curriculum, the objective is for young children to be able to identify and analyze simple repeating patterns, extend them, and make predictions about them (NCTM 2000).

Patterning is a very important part of the mathematics curriculum. "Mathematics is the science and language of patterns. Thinking about patterns helps children make sense of mathematics." (Copley, 2000, p.83) Patterning also sets a foundation for algebra and functions. Another reason for focusing on
patterning curriculum is that children enjoy these kinds of activities. They don’t
consider it “arithmetic.” They are having fun while they are learning something
very important.

Kindergarteners are very familiar with patterning. They see it in their
everyday world. When they enter school or even at home, children notice
patterns in daily routines. At home they might put on their pajamas, brush their
teeth, and have a story read. They are familiar with that. At school the pattern
would be to walk in, put your bag away, sign your name, and read a book. They
know this routine as their pattern.

Young children enter school having observed patterns in nature, at home,
at play, and in stories (Copley, 2000). My role, as a teacher, is to bridge
children’s simplified knowledge of patterns to a more formal understanding of
mathematical patterns.

Although, in kindergarten, patterns are found throughout the day in other
areas such as circle time, literacy centers, playing with peers, calendar, or any
routine activity, my focus for this project is within the mathematical curriculum.

As a class or in small groups we can discuss how to extend certain
patterns or come up with our own. Lots of oral language is used in their problem
solving. This social interaction and inquiry follows the constructivist model.
According to Piaget, the exchange of viewpoints with other children is
indispensable for children’s development of logic (Piaget, 1947/1963; as cited in
Kamii, 1999). This is where they can be exposed to different interpretations and
different ways of solving the same problem.
There are a variety of activities we do with patterns. Extending patterns, translating patterns, finding patterns, and creating our own patterns are some examples. One activity that I do often when we go out to snack or recess is line up about four students in boy, girl, boy, girl order. I then ask them to extend that particular sequence. I usually don't have to say a word because they know exactly what comes next. I change the pattern once they become familiar with it. Another activity that we do during circle time is translating patterns. We translate from basic shapes and color patterns to the same patterns using body movements.

Calendar time is also a great place where we learn patterning. The days of the week and the months of the year provide us with great opportunities for children to observe patterns. We also observe and graph the weather so that children are able to see an example of a non-pattern.

**Parent Involvement**

Parents play a very important role when it comes to the cognitive, social, and moral development of their children. They are the ones responsible for what our children know or don't know when they first come to school. The students in my classroom this year all come from Mexican or Mexican-American parents. "In California, one out of every four students is a limited-English-speaking student. More than 70% of these students speak Spanish at home." (Webb, 2000, p. 292) All of my parents, with the exception of a few, speak only Spanish. My students speak mainly Spanish, except for a couple that speak both Spanish and English. Spanish, though, is still their dominant language.
Literature that is published on Hispanic parents' involvement in the schools indicates that, for a variety of reasons, many Hispanic parents are keeping their distance from the schools. Hispanic parents feel that it is the "educated" people's responsibility to teach their children and that going into their child's classroom is more of an intrusion (Espinosa, 1995). There is also the language barrier that makes many of our Hispanic parents feel uncomfortable. Factors such as poverty, single parent homes, low educational levels, time constraints, and barriers to communication between school and family also contribute to the negligible levels of family involvement in the schools (Perez & Pinzon, 1997). However, there is considerable evidence that parent involvement leads to improved student achievement, better school attendance, and reduced dropout rates, and that these improvements occur regardless of the economic, racial, or cultural background of the family (Flaxman & Inger, 1991; as cited in Inger, 1992). Hispanic parents need to be made aware of this evidence. It is the school's responsibility to reach out to parents and communicate ways in which parents can benefit their children's learning.

In a study conducted by the Hispanic Policy Development Project in 1990, they concluded that in order to overcome barriers between schools and Hispanic parents, there needs to be personal outreach, non-judgmental communication, and respect for parents' feelings (Inger, 1992, p.2). Espinosa (1995) also agrees that community outreach and personal involvement are crucial for attracting parents to schools. Other strategies that Espinosa (1995) suggests are perseverance in maintaining involvement, strong leadership and administrative
support, and staff development that focuses on Hispanic culture. The goal is to encourage parents to become involved in their children's learning.

It is very important for teachers to have good communication and to understand where their students are coming from. Students will receive support at home if teachers are able to communicate with parents in a language that they understand. Furthermore:

"In order to determine effective strategies for connecting Hispanic parents and their children's early education, educators need to develop a greater understanding of Hispanic culture, their childrearing and socialization practices, communication styles, and orientation toward formal education."

(Espinosa, 1995, p.1)

There are many ways that educators can reach out to parents and involve them more. Besides direct benefit to parents and children, teachers will benefit by getting to know their students' family background and practices. They can invite parents throughout the school year, not just for Back-to-School night or Open House. Parents can also be invited to volunteer in the classroom. In the primary grades having a parent volunteer helping in the classroom is almost a necessity sometimes. Since the kindergarten curriculum isn't complicated, training a parent to facilitate a center is simple. Teachers also need to make sure that notes are being sent home in Spanish. Parent meetings should include translating and babysitting services so that parents are encouraged to attend.
Parents Helping with Mathematics

One specific area to encourage parents to help their children is with mathematics. Many parents read to their child on a regular basis, whether it is in English or Spanish. Math, on the other hand, is more difficult for parents to make up if students don’t bring home that worksheet for homework.

Like reading, mathematics is a subject that is indeed necessary for functioning adequately in society (Hartog & Brosnan, 1994). However, parents may feel even less able to help in math, especially if students are being taught by constructivist principles or if it involves unfamiliar content. As teachers, we need to provide the training and knowledge so that parents are able to help their children with mathematics. According to the National Association for Bilingual Education (NABE, 2001), education depends on communication, and communication depends upon language and cultural understanding. In order for education to be effective, there must be comprehensible communication between teachers, students, and parents. This also includes communicating to our parents what we expect our students to learn in mathematics and different strategies for helping their children achieve those goals. Additionally:

“Teachers should support students’ mathematics learning through the languages that they bring to school. Students should also be encouraged and respected when they use their native language, as well as English, in their mathematical communication.” (NCTM, 2000, p. 73)
There are programs that help parents better understand how to help their children with mathematics. Family math programs, based on family literacy programs, successfully teach basic math skills to both children and their parents (Schwartz, 1999). Some of these programs include Family Math, created by the Lawrence Hall of Science in Berkeley, California; IMPACT, which stands for Inventing Math for Parents and Children and Teachers, created in Great Britain and is used throughout Europe; and EQUITY 2000 which focuses on students of color and is designed for schools that have a strong family involvement strand.

Utilizing one of these programs or creating one that is just as effective to help bridge the gap between our students and parents and mathematics, will also create a more positive outlook toward arithmetic. If we learn more about our students and their families and use this knowledge, we can improve math instruction and increase our students’ learning (Moore, 2001).

According to Moore (2001), family nights should include activities that attract parent participation and link home mathematics with class instruction. Parents and students should feel excited and eager to learn when attending a family night or family seminar. The atmosphere should be calm and non-intimidating. The language must be appropriate for parents to understand. It should work to build and extend cultural bridges between the home and school. The content of the workshop ought to consist of interesting and meaningful curriculum, so that parents and students can relate. This will definitely strengthen the connection between school and home mathematics for the students, as well as the parents (Moore, 2001).
My project definitely meets the needs of my parents and students. It was created to help reach out to Spanish-speaking parents and encourage them to help their child with math. "Proyecto Uno, Dos, Uno, Dos" provides parents with simple patterned lessons using materials that are found in the home. Parents and students are able to problem solve and reason together. Additionally, it gives parents and students access to computers and the Internet. This website will also provide parents with the confidence to help their child with math, and draw them into greater involvement in their child's school learning.
Chapter Three

Methodology

This project, entitled “Proyecto Uno, Dos, Uno, Dos,” originated after gathering literature and research that dealt with Piaget’s Constructivist Theory and how it relates to children’s acquisition of mathematical reasoning. I found that the most fascinating aspect of the constructivist model was how children acquire knowledge and how they can be autonomous. In mathematics, for example, children understand and explain exactly how they arrived at a particular answer. They aren’t given some magical formula to use and simply plug in numbers. Children can actually understand the process if given the opportunity to explore.

Background Information

A course that I was enrolled in on Constructivist Mathematics motivated me to research the topic in much more detail. This course also helped me to realize that my mathematical background wasn’t as strong as I had previously thought. One of the reasons was because of the manner in which arithmetic was taught when I went to school. I was shown the steps to solve a problem and then given more of the same problems to do on my own. I was simply regurgitating what the teacher demonstrated. I wasn’t learning or understanding the process.

Why a computer-based project

The reason that I decided on a technologically based project, as opposed to a simple booklet or pamphlet, is that I wanted to help bridge the digital divide. There is a growing gap between those who have access to computers and those
who don't even own one. In today's technologically advanced society, a
computer is almost a necessity. Even though I am using the Internet only for
delivering the information of my project, it provides exposure and access to those
who have limited or no knowledge of computers.

This particular project was designed so that my parents would not feel
discouraged or intimidated, since their technological experience was limited. The
website is easy to use and easy to follow. Once they use and navigate this site,
parents will feel much more comfortable and confident with their computer skills.

The need for this website

The idea for creating a website using this information on constructivism
and mathematics came from my personal experience in the classroom.
Teaching kindergarteners in their primary language, which is Spanish, I often had
a difficult time finding math activities in Spanish on the computer. Our computer
lab didn't have any mathematical software that was in Spanish. I decided against
creating software or a CD-Rom because I knew that most of my population of
parents and students probably wouldn't purchase it. By creating a website, I felt
that parents would have more access to it. Even if parents don't have a
computer at home, there is access to computers and the Internet through the
classroom and the computer lab at school. This would give my parents the
opportunity to make use of the website.

I also felt that using Spanish for this site and its contents would be very
beneficial for my parents, since this is usually one of the obstacles they are faced
with. Using this medium, I can provide parents with ideas on how they can help their children at home.

\textit{Creation of the website}

For the actual website, I used the new Hyperstudio 4.0. Hyperstudio provides tips and useful information on how to organize and set up a website. It also has great examples of other websites that have been done in the classroom by other teachers and students.

The first step was to create the stacks and cards to enter my information into. Since I wanted to make this an easy site to navigate, I chose a basic and easy template design. I adhered to a school theme and used graphics that were related to kindergarten themes, like the colors red and yellow, chalkboards, and students working. This would not only make it attractive to kindergarten students, but parents and teachers would also be able to identify the site as a primary level site.

\textit{Organization of the website}

The organization of the actual website is simple and easy to follow. The main page has the project title with two sets of three links. The first set of links includes the buttons for the introduction, information for parents, and other websites that deal with mathematics. The second set of buttons are the actual patterning activities.

The introduction button gives parents an overview of what this website includes and why it was created. The next button includes helpful information for parents on the different patterns that will be used for the activities and some
examples of these patterns. The last button provides parents with other Spanish websites that they can use for additional help with mathematics, as well as other curricular areas. Since Spanish math websites were limited, I also provided parents with links that would further their use of the Internet. Some examples of these websites are Yahoo in Spanish and CNN in Spanish. Once parents enter these Spanish sites they will find many more links that may spark their interest.

There are three categories of patterning activities, with a link to each type. The first link takes you to the “copying” stack. The second link directs you to the “extending” stack. The last link leads to the “creating” stack. Each stack also includes a pattern translating activity related to the main activities.

Contents of the stacks and cards

The criteria that I used to select the activities included whether or not they correlated to the patterning and sorting curriculum for primary grades, mainly kindergarten and first grade, and were the activities consistent with the constructivist model. According to the Mathematics Framework for California Public Schools (2000), kindergarteners need to be able to identify, describe, and extend simple patterns by referring to their shapes, sizes, or colors. For first grade the standards require that students “describe, extend, and explain ways to get the next element in simple repeating patterns (e.g., rhythmic, numeric, color, and shape)” (Mathematics Framework for Public Schools, 2000, p29).

Additionally, I wanted these activities to be meaningful and related to my students’ learning. I also wanted these lessons to be simple and easy to follow, so that parents weren’t discouraged. The materials required for the actual
activities should be items already in the home or very easily obtainable. As I gathered curriculum for this website, I organized the lessons in order of difficulty. I wanted to make sure the easiest activities came first and progressed to more difficult ones.

*Copying Patterns*

The first stack, copying patterns, includes six cards. The first card is an introduction to copying patterns. It provides parents with a brief overview of each activity and with the materials they will need for the activities to follow. The first card in this stack also contains the five buttons that lead you to the "copying" activities. The next five cards are the actual "copying" activities that parents and children will do together.

The activities begin with a simple ABAB pattern and progress to an ABCD pattern. The final card in this stack includes students and parents translating from a simple ABAB pattern to a pattern using body movements. "Copying patterns" consists of using spoons, forks, knives, and plates to copy patterns. Children have contact with these items on a daily basis. This is where the constructivism aspect plays an important role. These items are very familiar to students and "playing" with them is probably a treat. Setting the table is something they would enjoy doing and would have meaning to both the student and the parent.

*Extending Patterns*

The second stack, "extending patterns," also consists of six cards. The contents of the first card includes an explanation of extending patterns, what
parents and students will be doing, and the materials that they will need. It also has the five buttons that link you to the actual "extending activities." There is also a translating activity as the culminating lesson.

In accordance with constructivist principles, I again chose very familiar materials for the activities-coins. Parents will help their child extend patterns created using pennies, nickels, and dimes. The patterns in this stack include AABB, ABB, and AAC. This section of patterns also includes two translating activities. One activity consists of translating the AAC repeating pattern from pennies and dimes to the same pattern using two different shapes. In the other activity, students need to translate the AABB pattern from pennies and nickels to touching their head and toes using the same pattern.

Creating Patterns

The last stack of cards, "creating patterns," is very similar to the other stacks. It also consists of six cards in which the first card includes instructions, materials, and buttons that link to the other five activities. The "creating patterns" stack allows for students to be much more independent than the other activities were. Here students have options on what materials they will use to create their necklace or bracelet. I have asked parents to use pastas of different shapes and sizes, cereal, buttons, and lifesaver candy so that children have a variety of objects. Children enjoy working with these types of things and most are found in the home. This stack of activities also includes a translating lesson where students translate the pattern that they used in a previous "creating" activity to the same pattern using body movements.
Commonalities of all stacks

The three stacks that comprise this website also contain a button that leads you back to the introduction page. In addition, each card in the stack includes a button that links you to the main page of that particular section. The cards also have arrows that lead you to the previous or to the next activity. The purpose for this is that I want to make sure that parents and students don't skip any activities since they begin from easy and progress to harder patterns.

Overall, the website is easy to read and easy to follow. The activities are also simplistic enough for kindergarteners and their parents to do and learn from together. This will definitely be a new way for parents to guide their children in math, but it will also allow them to explore beyond the worksheets.

Testing for parent friendliness

After completing a first draft of the website, I asked five parents of current students in my class to preview the website. These five parents were parents that bring their child to school in the morning or that have helped out in the classroom. Three of the parents were willing to preview the site. The other two parents wanted to help, but both worked and found it very difficult to make time. The other three parents who were willing to participate, were very excited about the website. I wanted their feedback on the activities, on the vocabulary, and on the ease of use. I provided them with a questionnaire (see Appendix A and B). The results of the test are found in chapter five.
Chapter Four

The Actual Website

The following illustrations are the actual stacks to the website, Proyecto Uno, Dos, Uno, Dos. Currently, the website is in CD-ROM form. The website is located within an HTML homepage. In order to access the website, the user needs to download Mrs. Gómez’s homepage, file:///Dl/Homepage.html, on Netscape and then link to the website by clicking on the Hyperstudio Plug-In icon.
Introduction to Website

This is the first stack on the website with the links to the other stacks.

Proyecto Uno, Dos, Uno, Dos:
Haciendo patrones y secuencias con estudiantes del kindergarten en el hogar.

Introducción  Ejemplos de Patrones  Otros sitios

2 + 2 = 4  Copiando Patrones  2 + 2 = 4
Extendiendo Patrones
Haciendo Patrones

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Copying Patterns Stack

This is the first stack that parents are introduced to after they review the contents and directions in the title page.

**Copiando Patrones**

En las siguientes actividades los estudiantes deberían de copiar el patrón que les presentan los padres. Recuerden que si su hijo o hija no entiende el patrón, sigan practicando ese mismo patrón usando diferentes objetos. No traten de presentarles un patrón o secuencia diferente cuando no han aprendido bien el más fácil.

En actividad 1, los estudiantes copiarán un simple patrón usando cucharas y tenedores.
Extending Patterns Stack

This is the extending patterns stack in the website.

Extendiendo Patrones
Introducción

En esta parte de los patrones los estudiantes deben de continuar el patrón que les hacen los padres. Para las siguientes actividades usaremos monedas de un centavo, cinco centavos, y diez centavos para extender o continuar los patrones o secuencias. Los patrones van a consistir de secuencias AABBAABB, ABBABB, y AABAAB.

-En Actividad 1 los estudiantes usaran monedas de un centavo y monedas de cinco centavos para extender el patrón AABBAABB.
Haciendo Patrones
Introducción

En esta parte de los patrones, los padres deberían de explicartes a los estudiantes las instrucciones pero dejarlos que sean un poco más independientes. Aquí es cuando los estudiantes demuestran si han aprendido y comprendido las diferentes secuencias de las actividades pasadas.

Los materiales que necesitarán para las siguientes actividades serán cosas que se les pueden poner en un hilo o estambre. Estas pueden ser pasta de...
Chapter Five

The Next Step

The goal for creating a project was to help my parents and my students in mathematics. In order to achieve this goal, there were certain requirements I had to meet. I had to find something that was simple and interesting to do, so that parents would be able to help their children. I wanted to use technology so that parents and students would gain some experience with computers. Since constructivism played an important role in my mathematics curriculum, the contents needed to be aligned with it. In addition, the material needed to be in Spanish because this is the parents' and students' primary language. After considering all these criteria, I created a Spanish website for parents which included patterning activities appropriate for kindergarteners and first graders. This website was created as an enrichment tool for parents. They now have a valuable resource in which they can help their kindergarteners with patterning activities, it's in Spanish so they understand, and an added advantage is that it's on the computer.

Limited Resources in Spanish

After teaching in a bilingual environment for six years, I realized that there was a need for a project of this type. I often ran into the same problem with my parents. There were materials for parents to use at home, but they were in English. There were also great websites for parents, but those were in English, as well. Most of the materials, websites, and programs that I came in contact
with used mostly numbers in addition, subtraction, or multiplication. I felt that there were areas that weren't being addressed, especially for kindergarteners. Patterning is a very important part of the curriculum. This is why I focused on this subject.

The first test

After finishing a draft of the website three of the parents in my classroom tested it. I gave them all a set of the same questions in Spanish. I have attached the questionnaire with the Spanish questions at the end (see Appendix A). My goal was for the parents to have the questions by their side while they were actually navigating the site. I wanted to know if they found the site appealing and easy to navigate. I asked them if they understood the objectives of the activities and the vocabulary that was used. I also wanted to know if they actually liked the site and its contents. Another thing that was very important to know was whether or not the children understood and enjoyed the activities. Finally, I asked them what they would change to make it more captivating for our Spanish speaking audience.

Parent Feedback

After I gave my parents a week to review the website, I asked them to come into the class for a brief and informal interview. They all had different schedules, so I met with them at different times. I had the website on the computer so we could view it during the interview.

The first thing that was very interesting was that the three parents that I asked to review the site had varying levels of technological experience. The
only criterion they had to meet was that they had access to a computer. These three parents all did. Two of the parents owned one; the other parent had a relative who would allow her to use it. The two parents who owned a computer were more computer literate than the one who didn't have one at home. Of the two parents that owned a computer, the parent that worked felt much more comfortable with a computer than the one who stayed home because she used the computer at work. The parent who didn't work had her husband help her and her child with the navigating and the activities of the site. The parent who didn't own a computer, but had access to one, wasn't too comfortable with computers but she was willing to get help from a relative.

My first question to all of them was their first thoughts when they opened the website. They all seemed to like the colors and the big print. One parent particularly enjoyed the colorfulness and some of the sound effects. They all were very happy that it was in Spanish. This was the first Spanish site of any kind that they had seen on the Internet. They want me to create more in different curricular areas.

The actual content and vocabulary was easy for them to read and understand. I had some minor changes with vocabulary usage in some of the activities in the "copying patterns" section. Two of the parents needed a refresher with translating patterns. They understood copying, extending, and creating, but translating was a little more difficult. It seems that the students are having the same problem. We went over some different activities that pertained to each area of patterning so that they understood exactly what copying,
extending, translating, and creating patterns were. They were all much clearer about each area after this demonstration.

They also enjoyed the activities very much. They didn't have to worry about printing anything or going out and buying the materials. One parent said that her child asked her when they were going to stop playing with the spoons and start doing work. Another parent said that her child now understands that pennies are only worth one cent and that nickels are worth five. She learned this by patterning. She was really excited. Another parent said that all her child wanted to do was make AABB necklaces for all of her family and friends. She's out of pasta now.

One of the parents that participated was very enthusiastic and encouraged because she was able to talk more to her child when doing these activities. Most of the time when her child is doing a homework sheet, the child simply asks what to do and goes about her way and does it independently. This mother really enjoyed the interaction that she had with her child.

The parent that had the computer at home and worked with a computer in her job was happy to see that this wasn't just another game that children play on the computer. She was glad that she could sit next to her son and read the instructions together. Usually her son will learn how to play a game quickly and no longer need mom or dad's assistance. This parent particularly liked that this was a family project. She says with their work schedules these types of family activities are scarce, but they will now definitely make time after already doing some of the activities on the site.
The parent who didn't own a computer went out and bought one. She wants to do the rest of the activities with her child, but she doesn't want to go ask to use a computer. She is going to ask a friend, one of the other participants, for guidance with her new computer. She was very relieved that she didn't have to do too much navigating. The buttons were easy and very understandable. The site was self-explanatory. She liked the fact that they could read the instructions and then go to the kitchen table and do the activities. This parent and her child now know how to set a table properly.

Overall, the parents and the students felt very positive about the website. They were all going to go back and finish the other activities. They were also going to share the site with other parents who had children. The patterning activities were great ideas that they would have never thought of. They no longer have to go out and purchase workbooks on patterning. They can simply use everyday household items and have more fun doing it together.

There were many common themes that I found after interviewing with these parents. I realized that there definitely is a need for Spanish math resources, especially on the Internet. I also recognized, that as teachers, we have to find ways of reaching out to our parents. Communication is a crucial factor between the school and the home. Most importantly, I found that all parents want to help their children learn, no matter what language they speak. Some parents just need the tools and some guidance. As educators, we can provide our parents with these needs.
Future Use of the Website

Now that I've completed the website, I want to make effective use of it. I will inform more parents about it. I would also like to host a "Family Night" at our school. My colleagues will also be informed so that they are aware that there is a primary mathematics site available on-line for our Spanish-speaking parents.

As I continue to use this site, I plan to add more activities. I would like to create activities for different areas of mathematics in kindergarten. One area in particular is mathematical reasoning. This is an excellent area where constructivism can have a very strong impact, especially for younger students. They have to make decisions, determine what strategies they will use, and then justify their answers based on their prior experiences.

With the website that I created I was introducing this concept of constructivism. I felt that using patterning and sorting activities to do this would make this process easier. Parents would have questions to ask and be aware that there is more than just a right answer.

As I learn more about technology, I would also like to add more interactive activities and games so that students and parents also receive added experience in technology use. In this learning process, I will also try and make the actual website more appealing by adding moving objects and more sound effects. Although navigating this type of website would be a little more difficult, it would also help in bridging that digital divide even more.

Based on what I found that pertained to my project and after talking to some parents, I now am very much aware that there is a need for these types of
issues to be addressed. Our parents need the tools to help their children. There should be equal access to the curriculum, no matter what the language is. If we communicate with parents and address their needs and those of their children, the world of education will be a much better place.

*If I impact the life of at least one child in my years as a teacher, then I will have realized a dream.*

—Delia Gómez, 2002
Appendix A
Cuestionario para Padres

Favor de tener este cuestionario con usted cuando use el sitio

1. Encontró este sitio fácil de usar? Le gustaron los colores e ilustraciones?

2. Entendió las instrucciones de las actividades? Entendió el vocabulario que se usó?

3. Se divirtieron usted y su hijo mientras hacían las actividades? Cambiaría o agregaría alguna actividad?

4. Su hijo comprendió el concepto de hacer patrones?

5. Hay algo que usted cambiaría para hacer este sitio más interesante para padres y estudiantes?
Appendix B

Parent Questionnaire
(translated from Spanish)

Please have this questionnaire at your side while navigating the website, Proyecto, Uno, Dos, Uno, Dos.

1. Did you find this website appealing and easy to use? Do you like the colors and illustrations?

2. Did you understand the instructions for the activities? Did you understand the vocabulary used?

3. Did you and your child enjoy doing the activities together? Would you change or add activities?

4. Did your child understand the concepts of the patterning activities?

5. Is there anything you would change to make this site more captivating for students and parents?
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