From the interviews, it is most clear that the parents do not have an accurate understanding of the 5D. It appears they base their ideas on their preconceptions of what they think an after-school computer activity should be, on what they observe for themselves, and on what they hear from their children. Ordinarily these resources would likely prove accurate, but not in the case of the 5D which is so firmly grounded a theoretical framework. Theory is not so readily observed or explained by these resources.

The project is now faced with the decision of how and to what degree parents should be educated about the 5D. Some undergraduates have suggested that the parents be actively brought into the 5D to observe more of its operation and perhaps even to participate a little. This would be a mistake. The 5D is special in its fantasy approach to learning as well as its freedom from authority figures. Immediately with the introduction of a parent into the 5D, both principles are lost. On numerous occasions undergraduates' field notes have reported incidents in which a child's parent showed up and the child lost interest in an activity s/he was previously engrossed in. Bringing parents into the 5D is not the answer.

The parents need to become more involved by becoming more informed. The complexity of the project likely accounts for much of the difficulty in explaining it to the parents. Despite different efforts at doing so, it is clear the ideas behind the 5D are not being effectively conveyed to parents. Verbal communication with the site coordinator and newsletters to the parents have apparently failed. Perhaps a better means of educating parents would be to do so before their child even begins participating. A Parent's Letter of Introduction to the 5D could be distributed to every parent whose child requests an Application for the 5D that describes a routine day of a child in the 5D and then addressed such issues as the role of the UCSD undergraduate as they were encountered in the course of the day. Such a publication could be more widely distributed and in a more controlled manner than previous attempts at educating parents.

4. Uptake and Generalization of the System

Results concerning the future of an emergent, developing system are in principle foolheardy, but our cumulated experience with this after-school activity system is sufficient at least to provide some educated guesses about the near future: what may continue to grow and develop, what kinds of institutions are unlikely to provide sources of growth, and what pitfalls lie ahead even for those which show strong signs of continued development as we researchers withdraw to the role of university and/or community participants.

4.1. Uptake in the Community

Our greatest disappointment was that the staff of the Library decided at the end of this year that they did not want to see the 5thDimension continued at their site, despite the fact that the local Friends of the Library, which had sponsored the activities to this point, was in favor of continuing them. There appear to be a combination of reasons for this decision, but they all boil down to the fact that while children who participated in the 5thD also used the library, the activity was never seen as a major library function. We have already mentioned that vis a vis its surrounding, the 5thD was relatively boisterous and noisy. This was especially true on a couple of occasions late in the year when the children became overly enthusiastic about their activities.

In addition, as a governmental (county) institution, the Library is underfunded. There was no possibility of the County picking up the costs of a supervisor for the activities. At the same time, County rules excluded charging a fee for participation in the 5thD although parent support and income were more than adequate to the task. Hence, creative funding by the Friends would have been required, which, in light of staff opposition, was out of the question.

We plan to inquire if there are any substitute activities that the Library would like to institute, but we are dubious about their interest. Only time will tell.

The area where we experienced the most enthusiastic uptake has been among the Boys & Girls Clubs. The Solana Beach Boys' and Girls' Club is part of a regional and national association. Once our system began to spread into a neighboring club, the local regional office took an interest, and it is planned that there will be 5thD after-school activities in three neighboring clubs in the coming year.

The Clubs' seriousness in this enterprise was demonstrated over the summer when they hired two UCSD students trained in our program to act as site directors and committed themselves not only to hiring these students for the coming year (@11,000 per center), but to raise substantial monies and make these activities a line-item in their annual budgets. One of the centers has become so enthusiastic about the activities that they are planning to expand their building and make an after-school library/study/computer center on the basis of their past year's experience.

The third local site that has successfully adopted the 5thD and incorporated it into their activities is the La Jolla Children's School. This success came as something of a surprise for us, because we had been unsuccessful in penetrating a public school. An

especially intriguing aspect of this school's interest is that it extends to actual school time, not just after school. We know from a pilot study several years ago that under some circumstances at least, the 5thD metaphor can be used to organize mathematics curriculum in the elementary grades, but had not pursued this possibility in light of our concentration on after-school time.

The last local site that appears to hold promise for growth is the Catholic church in the barrio of Solana Beach. As indicated earlier in this report, it was only through the extraordinary efforts of a Chicana student that we were able to entice hispanic youngsters into the 5thD in the Boys' and Girls' Club, and our efforts to do so that the Library were a total flop. In the coming year a Chicana post-doc with an interest in computers and writing among bi-lingual children will be working with us to develop this site.

In addition, after-school activities involving the 5th D have been initiated in two of the distant sites that we have been in contact with via telecommunications, one in Chicago, the other in New Orleans.

4.2. Uptake by the University

It must not be forgotten that for the overall goals of this project as an experiment in innovation to be considered successful, there must be uptake by the University to match that in the community. Here, as in the community, the results have been mixed.

On the positive side, the University has provided both a half time "media clerk" staff position for assisting in making certain that the students involved know how to use the UNIX system, to maintain the data base of field notes and the children's bulletin board, and to help with maintenance of the small supply of PC's that students use to learn about the computer software and how to engage in telecommunications from local phones. They have also purchased a small number of PC's and the courses which support this activity are a part of the regular curriculum of the Communication and Psychology Departments.

Several problems remain, some threatening the existence of the University part of the system, some constraining the possibilities of growth. While the courses in computer networking and child development that we have taught in the past have been highly praised by the students, and there is abundant evidence of the ways in which this course benefits their development, they are not a priority for either the Communication nor the Psychology Department. In addition, difficulties arise if, for example, someone hired by the Communication Department to teach the course is not also a member of the Psychology Department, since cross-listing of courses is officially frowned upon. There has been a good deal of nervousness on the part of the computer center about supporting uses of the local computers which are not, strictly speaking, 100% devoted to education of UCSD students. And, it has been a struggle to get replacement PCs for students to use when old ones wear out.

These problems do not pose an immediate threat to the program, however. In the coming year a new teacher will be guiding the course, a media clerk with appropriate experience is on hand, and there is sufficient equipment. The real test will come in the 1990-1991 school year.

The problems to growth are more severe. One professor, teaching without additional support, can be reasonably be expected to work with 20-25 students, giving lectures, supervising field work and reading field notes. However, 20-25 students cannot be expected to cover more than 3-4 sites if those sites are going to conduct activities more than once a week (and some are aiming for 5 days a week). The answer here is to make coalitions with local programs in teacher education so that other sources of faculty time become available. This line of approach will be attempted in the coming year.

5. Year Four

According to plans laid down in the beginning of this project, the last year of the project will be concerned with two major activities:

1. Track the flow of activity in the system under conditions as similar as possible to the long term conditions assumed minimal for systems maintenance and growth.
2. Analysis and writing up of the results of the experiment.

We will discuss each of these areas in turn.

5.1. Tracking the Flow

In the coming year the UCSD courses that provide the student contribution to the system will be taught by a new professor (A. Nicolopoulou) without the benefit of a staff to supervise the operation of the 5thDimension at the field sites. In effect, this means a decrease in professional help for training the students at the start of the quarter.

This situation, while worrisome, is exactly the worry we have been striving to get to! Will the course be teachable without the added help of a great deal of research assistants? For purposes of next year's work, "teachable" does not mean, "Can the course be taught by virtue of heroic overwork?" but rather, "Can the computer media clerk in Communication provide enough support for training students; how many students can a single professor supervise; can field notes be read with sufficient attention to provide the students with a good education?" Our hypothesis is that all of this is doable. However, the class size that is supportable remains quite uncertain.

Simultaneously, a half time research assistant will be working with A. Nicolopoulou to describe the flow of the system (and its breakdowns or deterioration!) both in terms of quality of interaction within sites, community support, and student reactions. At present we know the system to be expanding, but how long this will last, and what transformations in activity may occur along the way await to be determined.

5.2. Analysis and write-up

This progress report, following as it does on a summer of intense data analysis and systems re-adjustment, provides our first attempt at creating a synthetic writeup of this project. We plan to approach this task from two directions at several levels of activity.

Within the 5thDimension itself we are seeking evidence about individual change in children and students as a function of the qualities of interaction that the 5thDimension affords. This effort has involved us in coding written discourse for each of the many children who have participated in the system over the past two-three years. At present this discourse is being analyzed in terms of the kinds of interactions observable in particular classes of task (an example of this approach in its early stages is provided by the analysis of King's Quest above) and in terms of such demographic characteristics as age and sex. It is our strong impression from these preliminary analyses that the wholistic portrait of children's behavior that we have obtained from the 5thDimension will provide a unique

perspective on questions of the age-periodization of middle childhood and its implications for computer mediated education. Simultaneously, we seem to be observing crucial aspects of the teaching/learning process in a variety of cognitive and social domains that have escaped previous systematic analysis.

There should be two classes of products from next year's efforts. First, a set of materials, procedures, and institutional arrangements corresponding to the new educational activity system we set out to create (such a set may, of course, look very dismal indeed--time will tell!) Second, a book-length monograph on the developmental systems effort we undertook, its major results, and the lessons it holds for future theory and practice.

Appendix 1

The Fifth Dimension and its play-world

Ageliki Nicolopoulou[1]
LCHC, March 1989

"...the rules of the game. These rules in their turn are a very important factor in the play-concept. All play has rules. They determine what "holds" in the temporary world circumscribed by play. The rules of the game are absolutely binding and allow no doubt. ...No scepticism is possible where the rules of a game are concerned, for the principle underlying them is an unshakable truth....Indeed, as soon as the rules are transgressed the whole play-world collapses. The game is over. The umpire's whistle breaks the spell and set "real" life going again.

The player who trespasses against the rules or ignores them is a "spoil-sport". The spoil-sport is not the same as the false player, the cheat; for the latter pretends to be playing the game and, on the face of it, still acknowledges the magic circle. It is curious to note how much more lenient society is to the cheat than to the spoil-sport. This is because the spoil-sport shatters the play-world itself. By withdrawing from the game he reveals the relativity and fragility of the play-world in which he had temporarily shut himself with others. He robs play of its illusion--a pregnant word which means literally "in-play" (from *inlusion, illudere or inludere).* Therefore, he must be cast out, for he threatens the existence of the play-community."

(From "Homo Ludens" by Johan Huizinga)

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[1] Although this document was written by me, the ideas it conveys belong to the collective cultural heritage of LCHC. A number of people, most importantly Mike Cole and Peg Griffin, have collaborated over time in creating, maintaining, and sustaining the Fifth Dimension program. The ideas expressed in this document are particularly indebted to the way I have understood what Peg Griffin has told me in numerous conversations and to my understanding of what Mike Cole was trying to do at site.

The Fifth Dimension structure is the world of the Wizard. "...The Wizard has created a Fifth Dimension, a place where all can meet and do great things", as the Constitution states. To facilitate the smooth functioning of the Fifth, the Wizard has left several documents that explain what one must do everyday and how to go about it. These documents consist of the Constitution and Personal Map for the citizens, the By-Laws and Record of Activities for the Young Wizard's Assistants, and even the task cards that describe how to play a game at three different levels. (See Appendix A for a sample of these documents.) Since the Wizard can only be reached through electronic mail, one of the computers at site is dedicated to telecommunications where children write to and also receive letters from the Wizard.

(2) The role and function of the Wizard

As the creator and author of the Fifth Dimension, absolute authority resides with the Wizard, although very rarely one experiences the Wizard in unequal power relations. While the Wizard can actually introduce any change in the Fifth, new changes always originate from complaints or grievances about some aspect in the Fifth that was not functioning properly. When the Wizard announces new changes, he or she--even it (who knows?)--always tries to justify them and present the rationale behind them. Likewise, he or she expects that the citizens and Young Wizard's assistants (YWA) will write back and express their opinions about the changes, evaluate them, and even suggest improvements. Thus, the message conveyed--implicitly and sometimes explicitly--is that any rule in the Fifth is open to discussion and negotiation between the Wizard and the citizens or YWAs.

From day to day, the Wizard oversees the smooth functioning of the Fifth by making sure that the computers, the disks, and electronic mail is functioning properly. S/he also makes sure that the citizens and the YWAs are enjoying their activities and that they are progressing on their journeys through the Fifth. The Wizard is in constant communication with the citizens and the YWAs, who keep him or her informed of where they are in the Fifth, which games they played, what they are in the middle of doing, what progress they are making, and also send hints about a game. If the Wizard evaluates the hints as good and helpful, s/he will place it in an electronic hints box for everyone at site to use when playing that game.

At important junctures and new decisions in the Fifth, the children initiate writing to the Wizard, like petitioning to become a young Wizard's Assistant or to get a Free Pass or to ask for credit for rooms whose games have changed, and so on. Equally, when the Wizard doesn't suffer from information overload, which--alas--happens more often than we like, s/he, as the all-knowing Wizard, might initiate a letter to a citizen or a young assistant. Sometimes, it is to congratulate them on their progress, or to thank them on been helpful to a new or young citizen, or for sending a nice letter to another site, etc. But, other times, it is to urge them to focus on their journey and on their activities, or to point out to them how close they are to either a door that they can transform their creature, or to the goal of becoming a Wizard's assistant, and thus provide direction and focus on their activities. Unfortunately, at times, the Wizard even undertakes the difficult role of reminding the children what is the proper behavior in the Fifth and urge them to reread their constitution and By-laws.

I. Overview of the Fifth Dimension program

The Fifth Dimension is an afterschool educational activity that deliberately combines play with education to promote computer literacy. Children of elementary-school age (from 7 to 12 years) play a series of games, one for each of the rooms in the maze-like structure that they have entered. Each game is accompanied by a task card which specifies three levels of difficulty to play a game and which, in turn, specify the child's movement in the maze. The goal for the child is to visit all twenty rooms of the maze and thus become an assistant to the electronic Wizard who is the creator, author, and still supervisor of this and other similar Fifth Dimensions around the world.

(1) The concrete Fifth Dimension maze

The Fifth Dimension consists of a concrete twenty (or twenty-one) room maze which serves as the focal reference point to organize and direct children's activities. The mazes used so far are open-top models with several dividers demarcating walls, and several openings in the dividers demarcating doors. Each room has several doors that connect it to the rooms around it, and all the rooms are interconnected. Rooms differ, however, with respect to the number of doors they have.

The rooms are visited by little figurines (cruddy or transformed creatures) which are chosen by and stand for the children who are the citizens of the Fifth Dimension and are making their journey into the Fifth. There are four main entrances in the maze through which the children's figurines can enter. At each room there are two activities and the child chooses one of them to play. In playing a game, the child follows a task card which indicates three levels at which the child can play: beginner, good, and expert. The levels determine the child's consequences of how to move through the maze. In general, the higher the level the more choices children have in moving through the maze.

Each maze has a flat cover that fits exactly over it, which is kept covering the maze. To move one's figurine, one opens the cover, picks through, and moves it. On the cover, a 2-dimensional map of the maze is drawn, marking carefully the main entrances, and the doors of each room. Sometimes, the rooms of the maze have names; then, the name, the number, and the two activities that form the choices for each room are on the map. Children carry an identical map, but of smaller scale, in their folder so that they keep track of their journey. The only difference between the main and the children's map is that the latter does not indicate the activities that can be played at each room. In fact, the only place that this information is available is in the central Fifth Dimension map.

A child that has chosen a cruddy creature and is ready to enter into the Fifth Dimension is ready to become a citizen of the Fifth. Upon entrance they receive the constitution to the Fifth Dimension, which an adult Wizard's Assistant assists in reading and explaining. After becoming a citizen, the main goals that adults negotiate and urge children to achieve are: (1) to exit from a different door than the one they entered so that they can come back transformed; and (2) to visit all twenty rooms in the Fifth Dimension and become a Young Wizard's Assistant. (The adults around the site have the status of Wizard's Assistants.)

(3) The rules of the Fifth Dimension journey

The child, through his or her "creature," enters the Fifth Dimension choosing one of the four main entrances. Then she chooses what game to play and at which level. After completing that level of the game, she looks up the consequences, which indicate where she can go next. Sometimes, there is no choice of where to go next, but sometimes there is, and the child is called upon to decide. In the new room, she chooses again the game and the level she would like to play and in this manner continues traveling through the Fifth.

At her journey--depending on the effort she exerts on the game--she might earn a Free Pass. One **truly Free Pass** is given upon entrance to the Fifth, but the rest are **earned Free Passes** that the citizens receive as consequences to some of the rooms, but always at playing the good or expert level. A free pass can be exchanged for a game at a room that the citizen doesn't want to play that game and she receives credit for having visited that room. *One free pass gets beginner consequences,* while *two free passes get good consequences,* but she can't buy off expert level.

Sometimes, when the citizen comes to a new room, there might be some good reason of why the child can't play the desired game in the room; there might be something wrong with the equipment or the game; or someone else might be playing that game and there is some good legitimate reason of why she can't join them; or the room is under construction, and so on. Then, the child can fill out a **Room-to-do** card, which asks her to promise the level at which she, as soon as possible, will return to play that game, and so she continues her journey for the day *taking the consequences for the level she promised.* But, if she can't play the level she promised, then she must follow the new consequences! Because of that, it is a good idea to try to complete the promised room as soon as possible.

Other times, however, a child comes to the Fifth Dimension with a friend and they would like to play together, or there might not be enough computers around and children who are at different parts of the maze need to be paired up, and so on. The citizen, then, who disrupts her normal course must fill out a **Room-Done-out-of-Sequence** card indicating which game(s) she played and at which level. *Next time, however, she must return to her journey* and only when her itinerary brings her back to the room done out of sequence, she can take the consequences for that room.

Lastly, sometimes the consequences lead the citizen to a room in the Fifth Dimension that is in sharp contrast to all the other rooms: the **Dare** room. If the child chooses to go to the Dare room, there are no choices and there is no way of controlling her consequences in that room. She must roll the **twenty-sided dice** and go to the room that the dice shows, no matter if this disrupts any other plans the child might have: like transforming her creature or visiting all the rooms in becoming a Wizard's Assistant.

(4) Children's roles in the Fifth

There are two main roles that the children can occupy in the Fifth: **Citizens** and **Young Wizard's Assistants**. The citizens are making their journey through the maze, while the Young Wizard's Assistants have visited all the rooms of the Fifth and are experts in 10 activities.

(a) Citizens and their artifacts: Constitution and Personal Map

When a new child enters the Fifth, she is given a copy of the Constitution that describes the Fifth and its rules. (See Appendix A.) They are also given a Personal Map that children use to record their progress through the Fifth. One side of the map is exactly like the main map and the child marks down, with the help of the adult around, which rooms she visited. On the other side of the map, the citizen writes down sequentially the activities and the level she completed them. In this way, one immediately knows what was the last game the child played and at which level so that she can always resume her itinerary, even if a long time has elapsed in between.

The citizens also write to the Wizard as they complete a level of the game. Many times they are asked to say what they did at the game, what kind of strategy they used to improve their performance, or even sent hints to the Wizard. The Wizard evaluates the hints and either puts them in the hints box for everyone to use, or sends them back to the children to improve them or answer questions about them.

Thus, children receive personal mail from the Wizard who encourages them to go on, congratulates them on their progress, and also gives them useful tips about the Fifth, or on any other topic about which they might have started a conversation.

(b) Young Wizard's Assistants and their artifacts: By-Laws and Record of activities

As soon as the citizen has visited all twenty rooms in the Fifth and have completed 10 activities at the expert level, she can petition the Wizard to become a Young Wizard's Assistants. The citizen needs to tell why she thinks she will be a good young Wizard's Assistant and how she can help her site and represent the Wizard better. The kind of activities that the YWAs are asked to do are mainly three: (a) help other citizen in their site and other far away sites play a game; (b) represent their site; and (c) become more experts with computers to assist the Wizard better.

To achieve the first goal, they must get to know all the activities in the Fifth and also become experts in more than just 10 activities. They can immediately help with games that they are already experts at, but in order to get to know more games they have to enter into the Fifth from one of the main entrances. However, they can speed their journey by answering mail about games that they know well and are experts at. For any good reply, the Wizard will send them a Free pass. Also they can help other children by answering mail for another site.

Sometimes, the Wizard sends them special assignments like making a photo-layout of their site to send to sites in far away places. In this case, the young assistants are asked for special collaboration. Or they are asked to answer mail that comes particular to their site from other places.

Finally, there might be some projects like a logo writer, or a publishing software where the young assistants are expected to participate more vigorously than any one else at site.

(5) Adults' role in the Fifth

Besides the occasional visitor, all the adults who work in the Fifth have the status of **Wizard's Assistants** (WA) and some have even been awarded the status of **Chief**

Wizard's Assistants. The real difference between WA and CWA is the amount of knowledge and expertise that the CWAs have about the Fifth: its rules, its games, its citizens, and even the collective knowledge that the site has achieved, and so on. For this reason, CWAs are given greater responsibilities from the Wizard and, thus, are in constant communication with the Wizard.

(a) Wizard's Assistants

All the students in class assume the status of WAs at site. They are supposed to be--but mainly become--the expert members of the group and for this reason are trained for two weeks before they come to interact with the citizens and YWAs. Their initial training consists of: (i) familiarizing them with the structure of the Fifth, its rules and organization, as well as the educational and psychological principles underlying the Fifth Dimension; (ii) learning to initiate a new citizen into the Fifth and assisting an old one in progressing through the Fifth; and (iii) familiarizing them and possibly learning the computer games that are used at their assigned sites. To be sure this training continues the entire quarter through the class, but the first two weeks allow the WAs to obtain an initial familiarization with the setting before they are asked to interact with the children, which adds an extra complication.

After the initial training, a WA works with a small group of children (on the average two) and assists them in their journey through the Fifth. This involves helping them with any initial difficulties they might have, like choosing a game, choosing a level to play, as well as with any difficulties they might have during the game. The emphasis on the part of the WA is to use the task card and structure the children's interaction, play the game together with them, and thus pass on new knowledge and enthusiasm about the game. Furthermore, the group must learn to work collaboratively as a team, learn to discuss difficulties about the game, and come to resolve them with the help of other members of the group, the WA, other members at site, or even from far away places, and so on. Getting the children to work together, helping them to conceptualize and communicate their difficulties, and ultimately coming to create and share a common knowledge among the members of the group is the goal of the class, the lectures, and the assigned readings. In addition, writing field notes about the interactions with the children will help to reflect back at what went on during site, assess the situation objectively, and think or discuss with other students in class about alternative ways that one could have acted, and so on.

(b) Chief Wizard's Assistants

This role is reached by the coordinator of the site who oversees the smooth operation of the site and who is one of the people with whom the Wizard is in constant communication. The coordinator is the closest to an in-site representative of the Wizard and his or her major goal is to ensure that the citizens and YWAs are progressing toward their goals; that the equipment and software are working properly; that there are enough resources at site; and that the communication between the citizens, YWAs, and WAs and the Wizard flows regularly.

At site, the coordinator does not work with anyone in particular but oversees the flow of the citizens and YWAs, pairs them up with other children and WAs, makes sure that groups are heterogeneous in skill, and also attends and resolves technical or academic difficulties that the groups might have with their games. Furthermore, he or she

is a major source of information about the games so that when he or she has time to play with a group of children they manage to get much further into the game while also getting his or her enthusiasm about any game. The coordinator also shares the successes and even failures of a game, gives to the group ideas of how to increase their knowledge, and even how to share their successes in the way of hints with other groups. Also the group's cohesion and character comes to reflect the coordinator, who holds a high esteem position in the eyes of the children because of his or her close association with the Wizard and the power he or she comes to command over them.

II. Designing a Fifth Dimension

Besides the construction of the actual maze, a great deal of thought and effort is directed toward creating a Fifth Dimension map. The map attempts to accomplish several goals at once which need to be coordinated with each other: (1) the software activities included must correspond in ratio to the available computers; (2) the increasing levels that the activities can be played should be related to an increasing number of choices in the consequences so that the children are continuously motivated to perform at higher levels; and (3) provide genuine choices between the two activities in a room, while, at the same time, relating them in some way to the name of the room.

(1) Software distribution

The forty activities required to fill out all the rooms in the map must be allocated according to the distribution of the available computers. For instance, if a site has 5 Apple computers, 1 Texas Instrument (TI), 1 IBM, and 1 station for non-computer activities, then the map can include about 25 games for the apples, 5 for the TI, 5 for the IBM, and 5 non-computer activities. In this way, each of the computers available is represented equally in the map and thus the demand of each of the machines is kept in balance. To ensure this balance, however, two more conditions should be observed: (a) the games for the infrequent computers should be distributed around the rooms; and (b) they should not be paired with each other in a room, but rather with a frequent computer game (e.g., apple games).

The non-computer activities can be increased, according to researchers' (or teachers') judgments, but the ratio of computer to noncomputer activities should not exceed the ratio of 2 to 1. Also having a variety of different computers at site is based on the realization that a multitude of computers is dominating classrooms and real life. In this way, children can come to discover the great compatibility that exists between computers.

(2) Relation of levels and consequences

A general rule in the Fifth is that the choice of consequences must vary according to the level at which children complete a game. (The consequences per room are found at the back of the task cards that the child can choose to play for that room.) That is, when completing a game at beginner level, children receive no choices as to where to go next and must go to the one room indicated in the consequence card; when completing at the good level, the child has more choices; and when completing at the expert level, she has gained access to go to any of the adjacent rooms. This gradation of choices for the consequences aim to push children to play at a higher level and, thus, to get to learn more about a game.

(a) Beginner level consequences

If a child decides to play only at the minimum level possible and, thus, keep playing at the beginner level, the beginner level consequences are designed such that they allow the child to visit only a very restricted area of the Fifth; that is, from three of the four entrances the child gets quickly into a loop that takes her back and forth between two rooms, while the fourth one sends her to the dare room.

For example, in the BG club's map: (i) if a child enters from the entrance at room 9 and attempts to play only beginner level, then her itinerary would get immediately stuck in the next rooms: 9-->13-->17-->13-->17 and so on. To escape this loop the child must play one of the games at a higher level in either one of the two rooms, 13 or 17. (See Appendix B for the designs of BG club's map.) (ii) If a child enters from the entrance at room 19, this would also take her to the above loop very quickly: 19-->16-->17-->13-->17-->13, and so on to an infinite loop. (iii) If a child enters from the entrance at room 8, it would soon lead her to a new loop: 8-->11-->14-->11-->14 and so on. (iv) And finally, if a child would choose to enter from room 3, then the itinerary would be interrupted by sending the child to the dare room: 3-->4-->7-->6-->20(=dare), where she would have to go to the room designated by rolling the 20-sided dice.

(b) Good level consequences

Playing at the good level, the child has more choices but not all exits are open to her yet. In fact, sometimes the good level consequences send her back to the same room, she could have visited if playing beginner level, but this time she gets a Free pass. In general, however, she has more choices than if she played beginner level.

(c) Expert level consequences

The consequences for the expert level give the child *full* control of her itinerary through the maze. Then, the child is allowed to exit from any of the doors of that room; that is, she can go to any of the adjacent rooms--even to the dare room, if it is an adjacent room. (The consequence card for the expert level, however, merely enumerates the rooms to which the child can go, and it might be a good idea to write "go to any adjacent room." This way the implication of full control would be obvious to both the child and the adult playing with the child.)

The consequences for expert level carry further two interesting implications:
(i) An adult with a child can, while looking at the maze, plan the child's itinerary while assuming and implying that if she did expert level at a game then she would have full control to go out from any door; thus, they can plan the fastest route to a favorite game, or the most attractive route, and so on. Thus, the moment the child has completed expert level, the structure of the maze looses its resilient quality and becomes totally transparent. That is, it looses the quality that some doors can be entered from one side only and not from the other. (This funny property is always present at the good level, but it gets alleviated at the expert level.)
(ii) From the point of view of an adult designing a map: If playing at the expert level gains free access to all the doors, then there is a time when the 5th-d maze is exactly as it looks; that is, a door has the property that it has in real life, that it can be transversed from either direction. Under this condition, we can estimate the amount of traffic that a room can have; that is, the more exits that a room has, the more traffic we expect it to have (e.g., room 11 at the BG club's map). Taking this property as our starting point, we can place the shared and "favorite" games in appropriate rooms. (Of course, this is only a rule of thumb and the degree of difficulty of the levels of the games around it affect it as well.)

(3) Choices of activities and names of rooms

When confronted with two activities in a room, the child should be given a genuine choice. In general, the activities should be similar enough in type and quality, but also different enough to provide grounds for a real choice. They should not be so different in type or quality that there is so much bias that children do not get a chance to really choose. In addition, they should not be so different, that it doesn't make sense to have them in the same room. But, also they shouldn't be so much the same that the choice doesn't matter. In addition, in many Fifth Dimensions, there is an overall theme or topic from which the names of the rooms are generated. In these cases, the two activities should share some common topic so that it makes sense to have them together in that room.

For instance, in the Solana Beach Library site, the Fifth Dimension had the theme of the world and, thus, the names of the rooms were names of countries. Thus, the game "Odell Lake" and "Shark" were placed together in a room that had some connection with the sea: the Philippines.

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There are two sets of creatures that can be traveling in the Fifth Dimension at any time: cruddy and transformed. A cruddy creature is usually a 2-inch high rubber figurine, while a transformed creature is a larger and better version of a cruddy creature. When a child first enters the Fifth, she gets a cruddy creature that represents her as traveling through the Fifth. One of the goals transmitted to the child is to transform her cruddy creature. To do that, she only needs to exit from a different door than the one she entered in the Fifth. However, to concretely convey that goal, the actual difference in the appearance of the cruddy and transformed creatures is important. Cruddy creatures should be rather uninteresting, while the transformed ones should be magnitudes better.

APPENDIX A:

MATERIALS FOR THE CHILDREN IN THE STHO

The Constitution of the Fifth Dimension

A dot is the first dimension •

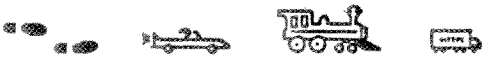
A line is the second dimension 

Some things are the third dimension 

Time is the fourth dimension 

This is the Solana Beach Library's *Fifth Dimension* !!!

This is the truth:

Young people play and learn with each other and computers. The Wizard wants to help (and get into the fun). There are Wizard's Assistants of different ages, too. So, the Wizard has created a **Fifth Dimension**, a pleace where all can meet and do great things. The young people can travel  with creatures  in the **Fifth Dimension**, they can **transform** the creatures, and let themselves become **Wizard's Assistants!**

How to start:

1. Get your **Personal Map,** your **creature,** and your **Free Pass.**
2. Enter a door into a **Fifth Dimension** room from outside.
3. Choose an activity or use a free pass. Decide beginner, good or expert level. Do it! Mark the wall chart, your **Record of Activities,** and your **Personal Map.**
4. Find your **consequences.** (Beginners may have no choice of where to go next.) Do the next room: choosing, deciding, getting a consequence!
5. **TRANSFORM your Creature or Yourself.** Go out a door you did not go in and **transform** your creature. Visit all twenty rooms and become a Wizard's Assistant!

(continued on other side)

Special Things:

1. To use a **Free Pass:** Give your pass to the Chief Wizard's Assistant (CWA). Tell which room you are passing because you just don't want to do it right now (or, because ???). Mark free pass on your map and continue on your journey through the **Fifth Dimension.** One free pass gets Beginner consequences; two free passes get Good consequences; three free passes means the CWA is **tricking you;** report it!
2. About the ***Dare*** **Room!!!** It is awful. No choices. No controlling your consequences. No passing by with a Free Pass. If you ***Dare*** to go into this room, you must roll the special dice; go to the room number that the dice tells you, no matter if it **ruins** your plan to transform a creature, no matter if it **spoils** your plan to become a Wizard Assistant, no matter what! Do you dare?
3. About **no equipment** for the Room you are **supposed to do:**

   Choose:

   (A) Agree to do the Room later; fill out a **Room to Do** card and give it to the CWA, mark your **Personal Map,** and proceed to the next Room on your trip. First chance you get, do the Room and get the card back from the tricky CWA; **OR**

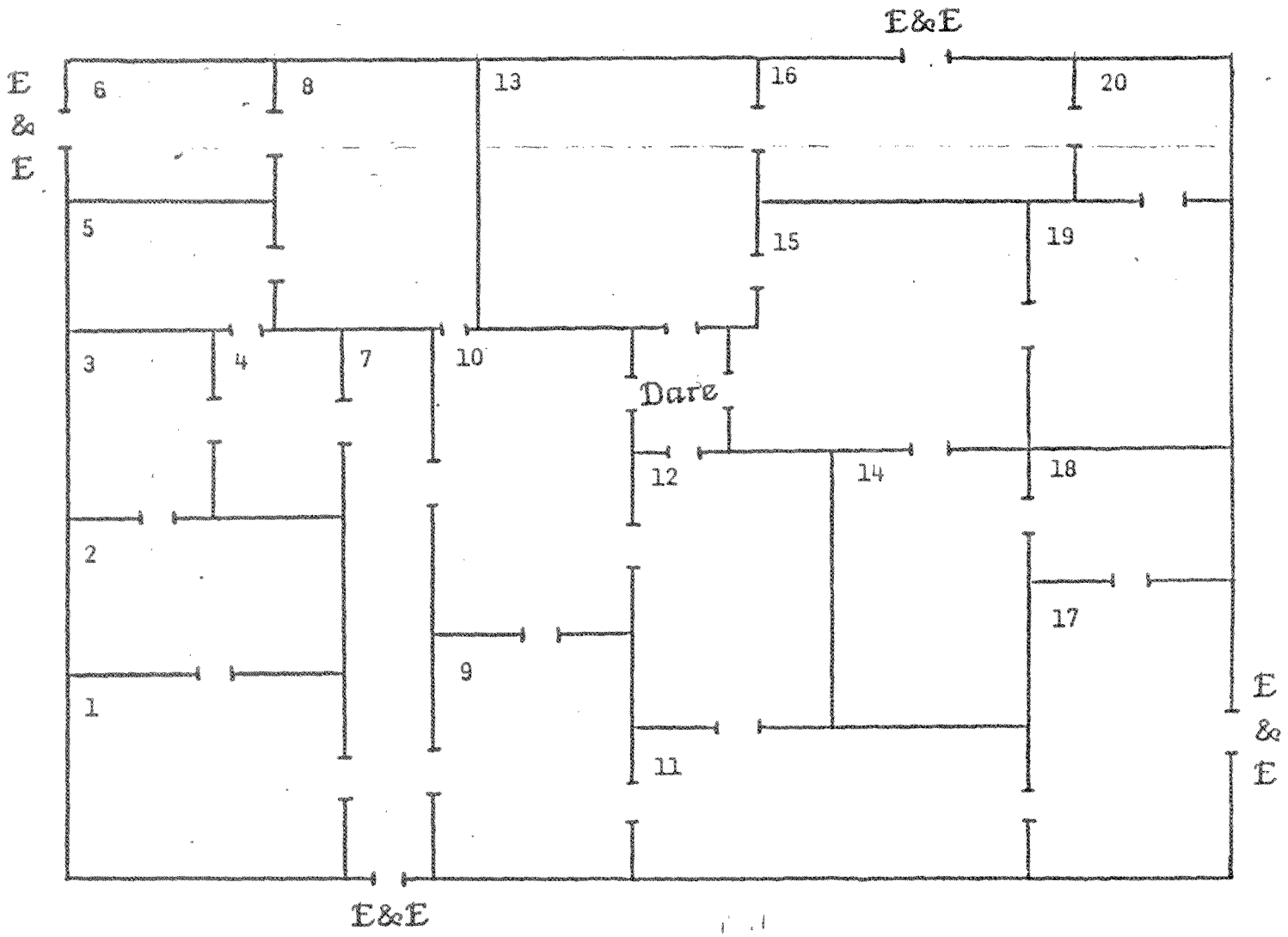
   (B) Look around and see something else to do. Check your **ELECTRONIC MAIL.** Work on the special projects that are going on. Or find a friend in a different room in the **Fifth Dimension** who wants you to work together; get a **Room Done Out of Sequence Card** from the CWA and mark your **Personal Map** and **Personal Activities Record.** When you come to the room later, you will be able to skip it and more quickly get your creature transformed or get to be a Wizard's Assistant!

4. Any special questions, problems, complaints, suspicions about the fairness of the CWA, please, send me electronic mail immediately. I must rely on you to keep the Fifth Dimension a good place!

The Fifth Dimension

Solana Beach Library

_____'s Personal Map



Cues to the Big Public Map:

 means use the Kaypro computer
(cake -k =kay; p +row = pro)

 means use an Apple computer
(pineapple - pine = apple)

 means use the TI computer and the TV

 means use something from the suitcase,
not a computer!

Record of Activities in each room and how each was done:

Room #	Name of Activity Chosen	B, G, or E?	CONSEQUENCE

By-laws of The Fifth Dimension for Wizard's Assistants

1. **Who is a Wizard's Assistant?** A Wizard's Assistant has visited all the rooms in the Fifth Dimension and has completed 10 activities at beginner or good level and 10 at the expert level. Once a Wizard's Assistant, always a Wizard's Assistant, **unless** probation comes!

2. **What is probation and what happens to a Wizard's Assistant on probation?** Probation comes if a Wizard's Assistant doesn't keep up to date on the things he or she is supposed to do. There is a ***Activities Record*** that lists all the assigned activities. If the probation lasts for too long (say a month), you are sent to the **Dare** room in the nearest Fifth Dimension, and then ...

3. **How do you stay off probation?** Make sure you complete the things listed on the ***Activities Record***. They are all about assisting the Wizard. Some things are about getting better and better at using the computers. Other things are about getting better and better at helping newcomers and citizens in the Fifth Dimension.

4. **How does the Wizard keeps track of who should be on probation?** Every day you need to send a letter to the WIZARD reporting the work that you have done. (Also keep your Activity Record current.)

5. **How do you get off probation if you are on it?** Well, when you roll the dice in **Dare**, it gives you the number of a room to go to. You go there and do a task and take the consequences. See, you have to work your way out of an exit to the Fifth Dimension again. Then you will be off probation.

6. **What does a Wizard's Assistant do to start?** First, look at your ***Activities Record***. You must do ALL of the activities listed in your record, before you can repeat any one of them. Also, in choosing an activity try to figure out what would be best for you, the Wizard, and the citizens of the Fifth Dimension.

7. How do I start everyday? Check your *Activities Record* to see what you are in the middle of doing - where you left off last time.

Record of Activities for Wizard Assistants: _____

You must do ALL of the activities listed in your record BEFORE you can repeat any one of them. Make sure to check all sides of your record.

As soon as you complete your activities for the day, you must write to the Wizard telling what you did. Also try to keep your record of activities current.

1. Helping Citizens of the Fifth Dimension

1. Become EXPERT at a game that you are not yet expert at. To do that, you must enter the nearest Fifth Dimension, through one of the main entrances, plan carefully how to get to the game you want. The Wizard will give you a FREE PASS to speed your way for EACH good letter you answer from any NEAR or FAR AWAY places.

ACTIVITY	DATE

2. At the games that you are already EXPERT at:

Help a citizen or newcomer to play one of these games in your FIFTH DIMENSION; make sure that you are really coaching them on how to play, that you are sharing your knowledge with them, and that they all take turns playing the game (preferably all except for you, unless you are needed).

Write to the Wizard about how the game went. What did the newcomers find the hardest thing to do? What did you find the hardest thing to teach? Give some suggestions to other WAs (via the Wizard) of what's the best way to help other people with the difficulties of the game you played.

ACTIVITY:	CITIZENS:	DATE:

3. At the games you are already EXPERT at:

Help a citizen in a far away place play a game, by answering mail about a game you know well.

MAIL FROM: CHILDREN TO: DATE:

4. Writing and publishing about the Fifth Dimension. Do any one of the following activities and send them to the Wizard:

**Write a story about some incident in your local Fifth Dimension
**Write about the Wizard and the role he or she plays in the Fifth Dimension
**Write about one of your favorite games
**Review a game by writing to kids at other sites about the game. Use the hints box (or folder to summarize good hints of how to play that game.

TOPIC: DATE:

II. Representing Your Site

5. Check the electronic mail regularly. Answer the mail from Chicago, Arizona, the Soviet Union or from any other **NEAR** as well as **FAR AWAY** places.

MAIL FROM: DATE ANSWERED:

6. Complete a special assignment from the Wizard for representing your Fifth Dimension.

III. Getting More Expert With Computers

7. Assist in connecting debishell, setting up the computers and even in checking and repairing the computers at site.

8. Special assignments from the Wizard using a computer programming languge.

ACTIVITY DATE

RECORD OF GAMES COMPLETED

YOUNG WIZARD'S ASSISTANT:

AGE:

EXPERT		GOOD		BEGINNER	

II. Designing a Fifth Dimension

Besides the construction of the actual maze, a great deal of thought and effort is directed toward creating a Fifth Dimension map. The map attempts to accomplish several goals at once which need to be coordinated with each other: (1) the software activities included must correspond in ratio to the available computers; (2) the increasing levels that the activities can be played should be related to an increasing number of choices in the consequences so that the children are continuously motivated to perform at higher levels; and (3) provide genuine choices between the two activities in a room, while, at the same time, relating them in some way to the name of the room.

(1) Software distribution

The forty activities required to fill out all the rooms in the map must be allocated according to the distribution of the available computers. For instance, if a site has 5 Apple computers, 1 Texas Instrument (TI), 1 IBM, and 1 station for non-computer activities, then the map can include about 25 games for the apples, 5 for the TI, 5 for the IBM, and 5 non-computer activities. In this way, each of the computers available is represented equally in the map and thus the demand of each of the machines is kept in balance. To ensure this balance, however, two more conditions should be observed: (a) the games for the infrequent computers should be distributed around the rooms; and (b) they should not be paired with each other in a room, but rather with a frequent computer game (e.g., apple games).

The non-computer activities can be increased, according to researchers' (or teachers') judgments, but the ratio of computer to noncomputer activities should not exceed the ratio of 2 to 1. Also having a variety of different computers at site is based on the realization that a multitude of computers is dominating classrooms and real life. In this way, children can come to discover the great compatibility that exists between computers.

(2) Relation of levels and consequences

A general rule in the Fifth is that the choice of consequences must vary according to the level at which children complete a game. (The consequences per room are found at the back of the task cards that the child can choose to play for that room.) That is, when completing a game at beginner level, children receive no choices as to where to go next and must go to the one room indicated in the consequence card; when completing at the good level, the child has more choices; and when completing at the expert level, she has gained access to go to any of the adjacent rooms. This gradation of choices for the consequences aim to push children to play at a higher level and, thus, to get to learn more about a game.

(a) Beginner level consequences

If a child decides to play only at the minimum level possible and, thus, keep playing at the beginner level, the beginner level consequences are designed such that they allow the child to visit only a very restricted area of the Fifth; that is, from three of the four entrances the child gets quickly into a loop that takes her back and forth between two rooms, while the fourth one sends her to the dare room.

For example, in the BG club's map: (i) if a child enters from the entrance at room 9 and attempts to play only beginner level, then her itinerary would get immediately stuck in the next rooms: 9-->13-->17-->13-->17 and so on. To escape this loop the child must play one of the games at a higher level in either one of the two rooms, 13 or 17. (See Appendix B for the designs of BG club's map.) (ii) If a child enters from the entrance at room 19, this would also take her to the above loop very quickly: 19-->16-->17-->13-->17-->13, and so on to an infinite loop. (iii) If a child enters from the entrance at room 8, it would soon lead her to a new loop: 8-->11-->14-->11-->14 and so on. (iv) And finally, if a child would choose to enter from room 3, then the itinerary would be interrupted by sending the child to the dare room: 3-->4-->7-->6-->20(=dare), where she would have to go to the room designated by rolling the 20-sided dice.

(b) Good level consequences

Playing at the good level, the child has more choices but not all exits are open to her yet. In fact, sometimes the good level consequences send her back to the same room, she could have visited if playing beginner level, but this time she gets a Free pass. In general, however, she has more choices than if she played beginner level.

(c) Expert level consequences

The consequences for the expert level give the child *full* control of her itinerary through the maze. Then, the child is allowed to exit from any of the doors of that room; that is, she can go to any of the adjacent rooms--even to the dare room, if it is an adjacent room. (The consequence card for the expert level, however, merely enumerates the rooms to which the child can go, and it might be a good idea to write "go to any adjacent room." This way the implication of full control would be obvious to both the child and the adult playing with the child.)

The consequences for expert level carry further two interesting implications:
(i) An adult with a child can, while looking at the maze, plan the child's itinerary while assuming and implying that if she did expert level at a game then she would have full control to go out from any door; thus, they can plan the fastest route to a favorite game, or the most attractive route, and so on. Thus, the moment the child has completed expert level, the structure of the maze looses its resilient quality and becomes totally transparent. That is, it looses the quality that some doors can be entered from one side only and not from the other. (This funny property is always present at the good level, but it gets alleviated at the expert level.)
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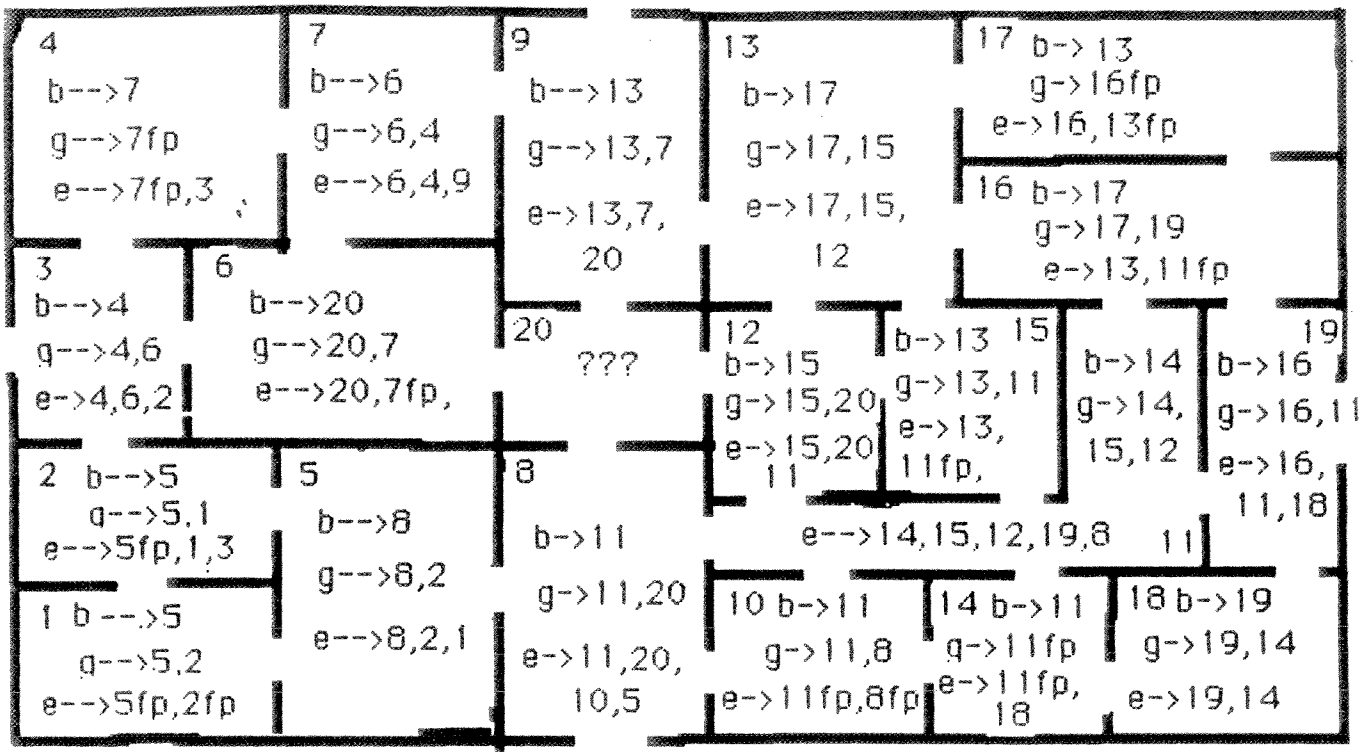
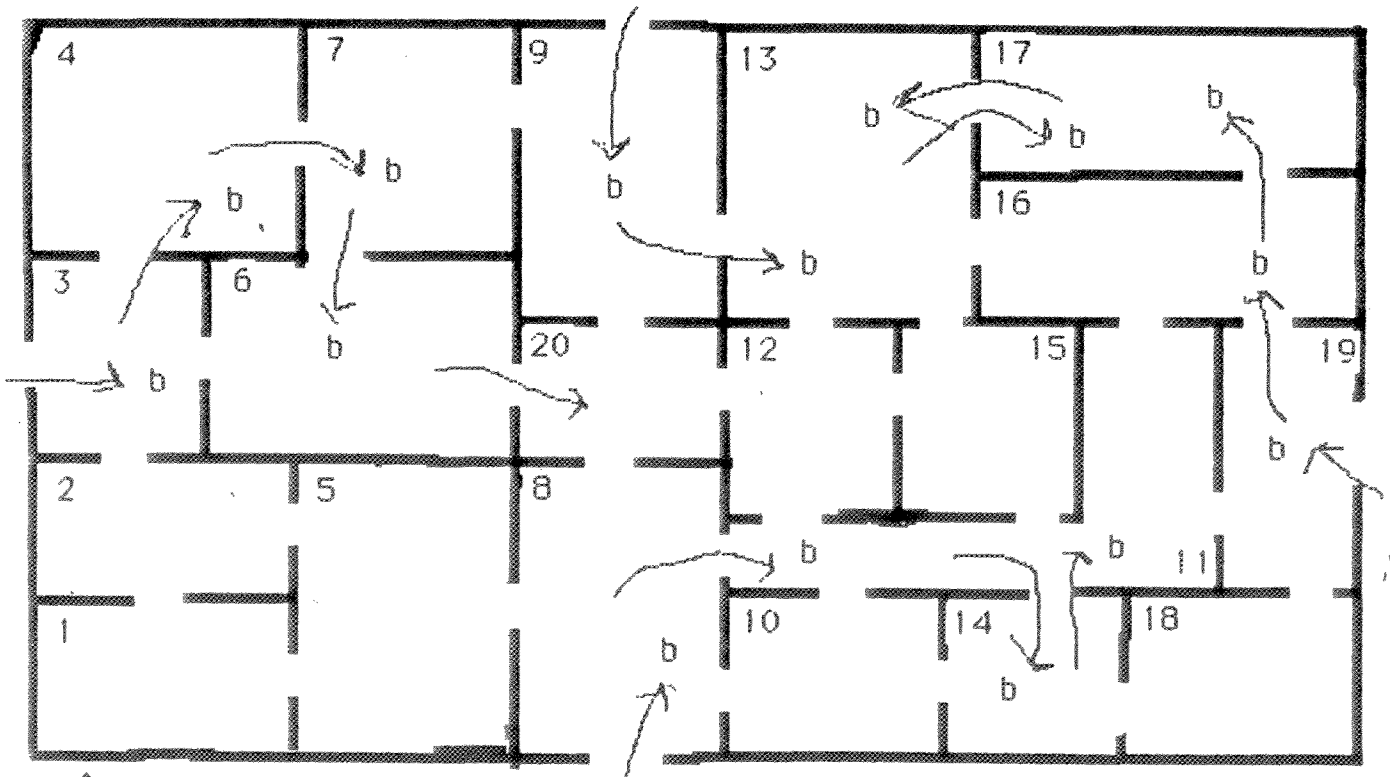


Original BG club Fifth Dimension Map
Consequences for All levels

spencer



Original BG club Fifth Dimension Map
"Beginner" loops

spencer

III. General Guidelines for Task Cards

Task cards are an essential component of every game in the Fifth Dimension, and their quality plays a big role in determining how successfully the Fifth Dimension can achieve its goals. It is especially important that they be constructed in a way that is consistent with the theoretical program which guides the Fifth in general. In order to help people create new task cards, or asses the ones that already exist, it might be useful to begin by clarifying (1) the functions they are supposed to serve and (2) the theoretical orientation they should embody.

The task card for each game specifies three levels at which it can be played: beginner, good, and expert. The levels differ in the degree of proficiency required; the intention is to allow children of different ages, abilities, and expertise to play and enjoy a given game. Ideally, each child should find at least one level available which is neither too difficult nor too boring for him or her. It should also be possible for a child to advance from one level to another, if he or she so desires.

However, it is important to note that the three levels should not be organized in a simple building-block sequence, with each level serving mainly as an introduction to the next. Each level should represent a complete and satisfying game in itself, clearly connected to the cognitive goals that the game is supposed to advance. On the one hand, this means that the child should be introduced to these goals, and given some means of achieving them, even if he or she doesn't go beyond the beginner level. On the other hand, while the higher levels should provide more depth and information, they shouldn't require the child to have previously completed a lower level. In most cases, the child should be able to choose any level at which to begin, and be able to backtrack to a lower level if necessary. (In the rare cases where doing one level requires the prior completion of a lower one, the task card should indicate this clearly.)

If the levels aren't stepping-stones, what it is their relationship to each other? The higher levels should work with the same basic framework as the beginner level, but should transform it so as to enrich and deepen it. Both the goals built into the game and the means of achieving them should be easy enough to be completed by any child who wants to give it a serious try, if he or she is provided with a little help (and remember that we have to accommodate a wide age range). The higher levels should be more challenging, and should give the child who completes them a fuller sense of accomplishment.

Often the games are already described in the booklet provided with the software. In writing the task cards we often have to go beyond the booklet (and the instructions that will appear on the screen), for several reasons. The most important reason is that the booklet instructions are usually guided (explicitly or implicitly) by a different theoretical agenda from the one embodied in the Fifth Dimension. They rarely bring out the cognitive goals of the game; very often, when they lay out a sequence of steps to follow, they reflect a stepping-stone approach; and so on. The task card should be written in such a way as to make the *point* of the game clear to the child playing it, and should be consistent with the theoretical agenda outlined above.

Here are some of the ways the task cards will go beyond the way a game is structured in the software. First, we often try to supplement the bare instructions with a *story* that will engage the child's imagination; the challenge here is to embed the goals of the game in a framework that can appeal to a wide variety of children. For instance, older boys are very interested in manipulating abstract geometrical shapes by transposing, reflecting, and rotating them at high speeds, but other children don't necessarily share this enthusiasm. We made such a game more accessible to a wider range of children by introducing it through a story that asks children to imagine themselves

as architects and constructors who are making multilevel buildings (see task card for Tetris). Another example: the system of X and Y coordinates, which is meaningless for young children, becomes meaningful when they are presented as crossroads where a building is located (see task card for Bumble game).

Second, we often try to supplement computer graphics with *concrete manipulable objects*, paper and pencil, crayons, and so on. For example, we help children discover the numerical key to the pattern of lily pads in a pond (see Pond task card) by having them draw the pattern on a piece of paper; count the number of lily pads in each segment; and then read out the numbers to each other, listening for the repeated numbers. Another example involves the Superfactory game. In this case, children are shown two cubes, one decorated and one blank, and asked to decorate the second cube so that they match. The children are also given an actual cube and cut-out pictures with which to decorate it; this helps them grasp the rotations and spatial relations involved by actually manipulating the cube themselves (see Superfactory task card).

Third, since we want to use the games to enrich children's knowledge, we will often want to ask them to *look up information* in books, atlases, encyclopedias, or any other resources available at the site. Sometimes this information will help them directly in playing the game (e.g., using a geographical atlas of the United States for "Carmen USA," or looking up hints in the mailbooks). At other times, the intention is more to help them enrich their general knowledge. In both cases, the point is to avoid having the game be an entirely isolated and self-contained experience; we should find ways that it can help expand the children's knowledge of the world and of issues in their environment, as well as their knowledge-acquisition skills. (Another way we try to do this is to introduce themes that highlight similarities between different games in the Fifth Dimension, so that the games can enrich each other.) The delicate issue here is to avoid giving the children the impression that they are simply back in school doing assignments. The challenge is to organize the games in such a way as to expand the children's knowledge and, in particular, to introduce a quest for learning without coercing them to do meaningless or school-like tasks. Remember that the play element should always be respected!

Finally, another crucial goal the task cards are trying to achieve is to break into the fast pace of the games occasionally to introduce some *reflective space*. The children should be given occasion and opportunity to reflect back on the way they played the game, and on how they might play it differently and more effectively. Thus, we ask them both (1) to stop and think about these questions and (2) to articulate their reflections by writing to the Wizard and giving hints about how to play the game. For instance, in one game that requires rapid hand-eye coordination, children are asked a few times to write down the scores (see task card for Choplifter). In many games, the children are asked to send hints to the Wizard about how to play the game. The Wizard, in turn, evaluates the hints and, if they are useful, places them in an electronic hints box for that game so that every citizen can use them. If the hints are not actually helpful, the Wizard will send them back to that child and will try to have the same child, or another child playing that game, improve those hints.

ROOM 5B: COLOMBIA BUMBLE GAMES

Runs on the Apple 2+, 2e or 2c

BEGINNER: Play "Butterfly Hunt" by guessing the row and column that the butterfly is in. Use the hints that the computer gives you to find it.

GOOD: Do the Beginner Level then play "Tic Tak Tok" by placing the Bumble Dots in a row. You need two players. Decide what point you want, then tell the computer.

AND

Tell the Wizard about the way you figured out how to place the dots.

EXPERT: Do the Good Level, then play "Bumble Games". Draw the Bumble's picture of a whale, a kite, and a house.

AND

Find out what the first number does that the second one does not do.

HINTS: Look at the **Hints Page** for any questions.

ROOM 5: COLOMBIA CONSEQUENCE CARD

BEGINNER: GO TO ROOM 8

GOOD: GO TO EITHER ROOM 8 OR ROOM 4

EXPERT: GO TO EITHER ROOM 8 OR ROOM 4 AND GET A FREE PASS

ROOM 68: KENYA CHOPLIFTER

Needs Apple 2+, or 2e and PADDLES

BEGINNER: You are a medic in search of stranded and wounded people in a war zone. You need to save as many victims as possible while enemy tanks are constantly shooting at you. While sharing the paddles with a partner, try to rescue at least 8 people and return them safely to the school building.

GOOD: Do the Beginner Level, rescue at least 12 people and return them to the school. Survive through the airplane attacks while still sharing the paddles with a partner. Write a message to the Wizard about what you think made the airplanes come, and write to the Wizard with hints on how to save the people without being hit by the enemy!

EXPERT: Play one game sharing the paddles with someone and then play one game by yourself. Were you able to save as many people by yourself? Write to the Wizard about which game was easier and why? As you save each group of people, notice the changes in the attackers!

ROOM 6: KENYA CONSEQUENCE CARD

BEGINNER: GO TO ROOM 8

GOOD: GO TO ROOM 8 AND GET A FREE PASS

EXPERT: GO TO ROOM 8 AND GET A FREE PASS OR EXIT AND TRANSFORM

ROOM 8A: SCOTLAND POND

Runs on Apple II+, IIe, or IIc

BEGINNER: Select the PRACTICE option and play Farmer Jane's Pond. Help the frog find its way to the end of the patch that the lily pads make! Use the "zero key" to see the entire path and draw it on a piece of paper. Do you see any repeating pattern in the path? Count again! Put in the repeating pattern to make the frog jump and tell the Wizard what happened.

GOOD: Do the Beginner Level, then choose the Puzzle Ponds but watch it!!!!!! The frog is tricky!!!! It doesn't always go forward and sometimes you have to split stuff up! Write a letter to the Wizard about how you split the numbers of the lily pads up.

EXPERT: There are two tasks for experts!

Select the GAME option. Get to at least one of the Puzzle ponds and conquer it! If you have trouble doing this, try what the beginner did and see if it helps. (There are a couple of hints in the good level.)

You are going to make the frog go in circles or at least, go back-and-forth, back-and-forth!!.

Select PRACTICE level, Farmer's Jane Pond. Figure out the pattern and make the frog do it! Say "yes" that you want to do the same problem again! But this time, you must make the frog go back to the beginning! If you achieve this, do two things: (1) Tell the Wizard how you did it!; (2) Press <control> E to let the poor frog stop!

ROOM 8: SCOTLAND CONSEQUENCE CARD

BEGINNING: GO TO ROOM 5

GOOD: GO TO ROOM 5 OR ROOM 10

EXPERT: GO TO ROOM 5 OR ROOM 6 OR ROOM 10

ROOM 16A: ZIMBABWE SUPER FACTORY

Runs on Apple

Beginner: Here's a chance to help the Wizard decorate a box using the Superfactory program-- maybe it's a present for some special person or wizard. You see the part the Wizard has already done and match it -- maybe being more efficient (using less steps) than the Wizard. Then, you add decoration, save it on disk, and send it to the Wizard for other kids.

Here's what to do:
Get the disk, BUT also get the real cube and the envelope with drawings and the funny shaped paper in it. (The pictures are the same ones used in Superfactory to decorate the cubes.)
Choose CHALLENGE from the main menu. Choose CHALLENGERS from the next menu. Choose WIZARD 1 as the decoration to work with. You are in the ANALYZE part of Superfactory -- you can figure out what the Wizard made so you can match it.
Carefully look at the cube. Hold down an Apple key and an arrow key to look at different side of the cube. Notice the little corner marks on one side, around the snail. The corner marks mean that's the front face of the box. See the corner marks on the real cube? Notice, the styrofoam cube also says top!

Your first job: Match the Wizard's decoration using the real cube and the pictures. If you want, you can make the computer cube start back at the front face right side up--just make sure the box is around RESTART and hit return. Then use the apple-key and an arrow to turn one step at a time. Can you get the snail upside down and then right side up again? Make some notes, maybe on the funny shaped paper (which you can also wrap around the cube!!!), so you'll remember when to turn, which way to turn and which picture to use -- this helps with ...

Your second job: Match the Wizard's decoration (or do it better using less steps) on the computer. Move the box to PLAN to program the computer-- tell it which pictures to use, say when it should turn the cube and which way so the pictures will go on right. You can TRY your plan. Test it on the real cube, while the computer tries, too.

(Turn this paper over for rest of the beginner task.)

If you think it won't match, you can EDIT--change it by inserting or deleting pictures or turns. After TRY you can CHECK to see if your plan makes the same cube as the Wizard's. If not, back to PLAN, EDIT and TRY again. (Hint: HELP (then HELP 2 using the apple and arrow keys) is good for ideas on how to edit your plan.) When the check says you have the right decoration, go back to PLAN and see if you did it the same way as the Wizard--use HELP 3 to see the Wizard's plan. (Maybe you did it more efficiently!) Then, make notes about the plan you want to use in ...

Your third job: Decorate two more sides of the box. Use the DESIGN part of Superfactory from the main menu. (If you are in PLAN, use TRY then CHECK then QUIT to get to the main menu.) Write the program so that you have the three sides the Wizard had but make it so that you add two more sides! (You can use the real cube to help!) Save it under your name. And then...

Your fourth job: Report by e-mail on what you did. Tell the Wizard what name you used in your third job. Ask for reports about other kids who get to see your decoration and try to match you!

ROOM 16A: ZIMBABWE SUPER FACTORY

Runs on Apple

Good: Here's a chance to help the Wizard decorate a box using the Superfactory program-- maybe it's a present for some special person or wizard. You see the part the Wizard has already done and match it -- maybe being more efficient (using less steps) than the Wizard. Then, you add decoration, save it on disk, and send it to the Wizard for other kids.

You have four jobs to do. They are the same four jobs as in the Beginner task,

BUT

you use WIZARD 2 after choosing Challenge and Challenger.

It is tricky to match Wizard 2 this. Can you make a plan so that all the pictures end up with the same side up as on the Wizard's cube? The snail isn't hard; the square isn't too hard. BUT, that other thing -- watch it, it's hard to get it right side up!

Look at the Beginner card for advice and instructions about the four jobs, but remember to use WIZARD 2 for this good level.

ROOM 16A. ZIMBABWE SUPER FACTORY

Runs on Apple

Expert. Here's a chance to help the Wizard decorate a box using the Superfactory program-- maybe it's a present for some special person or wizard. You see the part the Wizard has already done and match it -- maybe being more efficient (using less steps) than the Wizard. Then, you add decoration, save it on disk, and send it to the Wizard for other kids.

You have four jobs to do. They are the same four jobs as in the Beginner task.

BUT

you use WIZARD 3 after choosing Challenge and Challenger.

This is VERY tough and VERY tricky. Even the snail is upside down. And some pictures are used more than once! You had better be VERY careful during the analyze part and make VERY sure the first job helps you with the other jobs and make VERY good notes before you go into the PLAN part!

The Wizard used 17 steps to make the Wizard 3 decoration; can you be more efficient? One person did it in 14, without using any of the computer's help, and had a good witness to this, too. Of course, the person was a Wizard's assistant!

See what you can do. Be sure that job four has lots of details, and be sure to get a witness if you beat the Wizard's 17 steps!

Advice and instructions for the four jobs are on the Beginner level task. Only the third job is a little different: keep two of the sides the same as the Wizard's but make the other four sides of the cube according to your own design.

Hey, you can ask about CONTROL-T, and make a challenge for the Wizard or other kids while using different pictures, if you want.

ROOM 16: ZIMBABWE CONSEQUENCE CARD

BEGINNER: GO TO ROOM 20

GOOD: GO TO ROOM 13 OR ROOM 20

EXPERT: GO TO ROOM 13 OR ROOM 20 OR EXIT AND TRANSFORM

ROOM 17B: **MONGOLIA** **TETRIS**
Runs on Apple IIe (128K)

BEGINNER: You are an architect and a constructor designing a modern building, but as architects go you must have creativity and imagination. The conditions of the working environment that the Wizard choose for you are rather unusual!!! Instead of choosing the pieces you need to make a building, they just fall from the sky and they are different shapes and colors. You can either move them to the left (B), to the right (L), make them rotate (K), and even make them drop (,).
You are assigned at a far out place to make these futuristic buildings. Do take a second to see where you are and look at the surroundings! (To do this hit 4 while you are playing the game, and then hit P to stop for a second and see where you are.)

Your goal is **to make the pieces fit well together** so that your building has as few holes as possible. You can connect the pieces and make horizontal lines which stand for floors. So the more floors you make, the more famous you'll become! Don't get discouraged because your floors disappear as soon as you make them!

Set the speed that the pieces fall at zero (that's the LEVEL on your screen) and start making a brand new building (set HEIGHT at zero). Try to **make at least FIVE** such buildings and record your score each time.

Then increase the speed and make few more brand new buildings. Compare your scores and tell the Wizard what happened. What were you trying to do as the pieces were falling? Were you succesfull? What were some difficulties you encountered? What was the name of the laboratory where you were working? Check with the librarian or the electronic encyclopedia to see what can you learn about the place you were working at.

ROOM 17B: MONGOLIA TETRIS

Runs on Apple IIe (128K)

GOOD: A fellow construction/architect worker was called on to another assignment before she was able to finish her building. Try to help her finish it!

Set your HEIGHT to any value higher than zero. Set your LEVEL (speed) to any value you choose. Make a building that has at least 3 floors/lines.

Tell the Wizard how did you manage to do that. Did you do something special? Write a hint in the hints box. Also don't forget to tell the Wizard about the place you were working at? Did you find any more information about that place?

EXPERT: Get someone who is or claims to be famous at making these interesting buildings! In case none of you is that famous, do again Beginner or Good level.

Then set any values you want you want for LEVEL and HEIGHT parameters but they must be higher than zero. One of you plays the first game and record that score! Next the other one of you just leave the same value for LEVEL, and at HEIGHT hit the << option. This way you start with the exact same configuration. The winner must make a building with 8 floors/lines.

Tell the Wizard how your tournament went! Who was the winner and how does that person compares to the top ten comrades. Don't forget to read something about the place where your tournament took place and tell the Wiz about it!