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ABSTRACT

A hyperbook is a form of distance education that promotes computer-mediated learning and collaborative/constructive learning in the development of multigenerational learning communities. A hyperbook is composed of hypertext that resides on the Internet. Hypertext is text with embedded links that allow the reader to move around in the text or to other locations on the Internet. Hypertext is multilevel and nonlinear; it supports intuitive association and parallels the way a person learns by exploration and association in a dynamic, interactive, and nonsequential process. Hyperbooks can be accessed 7 days a week, 24 hours a day, thus allowing higher education to expand from serving students at a traditional campus to serving nontraditional students anywhere. This paper discusses a hyperbook designed to help teachers at the college level develop courses that are provided on or supported by the Internet. Among its goals are: using the computer to provide a many-to-many form of instruction rather than one-to-many instruction; creating a virtual infrastructure where participants in multiple cohorts can learn; and creating a multigenerational superdocument that will grow over time. The paper discusses the modular approach to instructional design, multigenerational posting by successive participants, the general philosophy of the hyperbook, peer collaboration, scaffolding student development, student evaluation by self and peers, navigating the hyperbook, and tips on hyperbook development. Numerous web sites are cited for examples and resources. (TD)

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Distance courses have been and still are especially appealing to that growing student body component - the off campus nontraditional student who may work full time and live some distance from campus. Computer mediated learning (CML) courses can overcome the temporal and spatial obstacles of isolated commuter students and busy schedules. Advances in computer hardware, software, and Internet access have provided educators with a plethora of computerized resources to augment their regular classes or create courses that are totally computerized. There are numerous studies that show no significant differences between a variety of distance learning/teaching techniques and traditional classroom instruction see, http://tenb.mta.ca/phenom/. Unfortunately, distance learning is typically more expensive to develop and to conduct than is traditional classroom learning. Efficacy must come from an increase in learning (either qualitatively, quantitatively, or both) when new forms of technology are adopted. The current focus in distance education generally is either on video or computer delivery. Computerized instruction can be done individually, in large groups, or in collaborative groups.

CML and Collaborative/Constructive Learning: Computer mediated learning (CML) increases efficiency only if the framework of learning changes. Given a collaborative group, the group knowledge is always superior to the individuals and therefore the collaborative product should be of higher quality. In a number of ways the group is more powerful than the individual.

Collaborative Learning in the Hyperbook: Collaborative learning is used in this hyperbook because it is a way to allow participants to have some control over their learning. At the higher levels of learning it is inappropriate to ask anyone to learn all of the things that a group learns in the same way that they group learns it. Learners must have some control over their learning. In collaborative learning the learners have some control over what they will learn. Participants are already beyond the novice stage and some will be experts. These will share their expertise with others in the group to increase the learning of all.

Developing Community: It is possible to develop educational communities that identify their goal as collective sense making through the collaborative experience. The activities in the learning community have a significant impact on the development of its members, Jennings and Dirkson (1997). The practices in the learning environment change and are changed by the social action system in which the learners are embedded. The social practice in which the learner participates influences the individual's psychological development. Students should be given an opportunity to experience collaborative process as part of their learning experience.
http://home.okstate.edu/homepages.nsf/toc/CMLHOME

Multigenerational Cohorts: Students can post their collaborative products to a course website where others can see them and use them as examples. These products will remain available electronically so that future cohorts of learners can use them and build upon them. This is the multigenerational learning site. Through the development of the multigenerational learning site and the use of its examples we can raise the level of understanding, the level of sophistication as those who come later go beyond those in earlier cohorts. Student products can be available for others to use as long as the hyperbook is on the web. The multigenerational site will illustrate students best efforts and will be available so that new learners can build upon what was developed before, as described by James (1997) at

http://www.soc.hawaii.edu/~leonj/leonj/leonpsy/gc/generations.html. Students are invited to return as mentors and to continue to modify and post new products to the site as their Internet teaching practice continues to develop.

Multigenerational Hypertext: Here we describe the process of developing a multigenerational hypertext as a series of modules combined to make a series of courses in the instructional design of CML focusing on education on the Internet. Students using the hyperbook learn to create materials applicable in all content areas using either traditional instructional design or constructivist instructional design (or both). Students also learn how to create and present web-based materials for presentation to students at all levels. Each module is presented in four formats so participants will have the opportunity to try different presentation approaches. Development of all twelve formats for presentation will be discussed. Instructors will be more likely to try teaching approaches with which they have experience. All instruction is designed to be platform free as participants from different universities will have different equipment and different programs will be supported by different institutions. Participants have the option of gaining graduate credit by selecting modules, which are appropriate for their development. Credit or CEU producing learning is product based. Participants work individually or collaboratively on all products. Collaboration may be local or at a distance. The idea behind product based learning is twofold. It allows sharing of products so others can see what is good and what really works. Secondly, it provides components for the educational portfolio, which can be used as evidence of learning and growth, and more importantly for raises, promotion, tenure, and faculty development.

What is a Hyperbook? A hyperbook is a text that resides on the Internet. It contains all of the components of a regular book and it has internal and external hyperlinks that can be used to move around in the text or to move to other local or remote locations using the Internet. Some hyperbooks allow users to annotate them or to add examples/material to the text. Participants can develop products and some of those products will be used as examples to illustrate good procedures in the hypertext. The hyperbook is a performance oriented hypertext which tells the participant the options which are available and the actions that are necessary to execute them.

Basic Ideas in Using Hypertext: Hypertext material is text which has embedded links to allow the reader to take many tracks through the material based on interest, previous experience or by external direction. Here the text is not linear. All learners cannot be assumed to be the same and therefore they will come with different discourse histories and different needs. Each learner will use text differently and this particular text differently too. Some will need a guidance system and others would not accept one if it were offered. Teachers should plan to provide prerequisite knowledge for some learner's thorough just-in-time learning. Note that learning here is individualized not cooperative. This implies that some form of preassessment may be needed to know when to offer assistance in learning for a learner at a particular point in the text. Teachers may need to control where students have been to insure that requirements are met. This means that the student's track through the text must be captured in some way if there are passages to which the learner must be exposed. Students will follow through the content and either agree or disagree with it, understand or not understand or sometime misconstrue the material. When this is evidenced the teacher should point it out. If this happens frequently a FAQ notice about the possible misunderstanding should be posted. In monitoring hypertext teachers should look for use patterns, which can be suggested to later students. They should look at the applicability of the links used and determine the interests of the students. All of these things will impact the directions which students take and teachers can make suggestions or text modifications based upon them. See tool at http://www.eastgate.com/ and examples at http://gut.it.emerson.edu/Courses/DigiCulture/Bogen/DC.site/Digital%20Culture%20Files/HText.htm.

Implicit Hypertext Design: Hypertext is multilevel and nonlinear. Ideas branch and lead to multiple places. The mode is compilation rather than linear constructive in nature. It cannot be recreated on paper. Large link sets require navigation in conceptual space and cannot be represented graphically. Hypertext supports intuitive association, which is heuristic, stochastic, and beyond. It stimulates integration and contextualization in ways not possible in linear thinking. In a sense hypertext transforms the reader into author as the link choices dictate the sequence and the content, which are experienced. Some argue that it fragments and decontextualizes the text but the track taken represents the individuals thinking process at a given point in time. All texts, which are linked, are co-resident, all exist at once. Linked documents cooperate; therefore no single document can exist in isolation. Hypertext parallels the way a person learns by exploration and association in a dynamic, interactive and nonsequential process. Hypertext is similar to the web but on the web site designer's control the links. Users on the web cannot add links but this is possible in hypertext.
http://cs.art.rmit.edu.au/projects/media/hypertext/publications/assessment/hypertext_teaching.html .

Practical Hypertext Design: Interconnections in hypertext can provide the learner with access to definitions, breadth and depth material, video, audio, graphics, text, and other materials which have been made available by the text designer. The metaphor is one of where do you want to go rather than what do you hope to find. This leads to the creation of semantic webs, which are trails through the network, which promote effective learning. See examples at
http://www.hcc.hawaii.edu/guide/www.guide.html ,
http://www.isg.sfu.ca/~duchier/misc/hypertext_review/ .

Why would we want to develop a hyperbook? More nontraditional students are entering or reentering college as downsizing displaces trained personnel, early retirement incentives allow people to start new careers while they are still vital and useful citizens, technology changes force skilled professionals to retrain, and new careers that did not even exist 5 to 10 years ago are now in great demand. At the same time, technology has placed into the hands of teachers and students powerful educational tools via computers and remote access to a fantastic array of resources via the Internet. Higher education faculty should address the needs of the ever-growing population of nontraditional learners as well as new traditional students to utilize these electronic tools and resources. These electronic tools and resources allow higher education to expand their campuses from serving students at a traditional central location to serving students around the world via distance learning courses.
http://www.cis.ohio-state.edu/hypertext/faq/usenet-faqs/html/hypertext-faq/faq-doc-11.html

Access and Hyperbooks: Hyperbooks can be used to teach in ways which go beyond what is possible in traditional classrooms, particularly for non-traditional students who have difficulty in meeting during traditional class times. Hyperbooks can be accessed 7 X 24, that is seven days a week, twenty-four hours per day. When this feature is paired with learning approaches that are asynchronous, learners can participate in learning activities on a 7 X 24 schedule. This facilitates learning for nontraditional, distant and other learners who cannot meet at regular class times.

What is this hyperbook all about? Generally this hyperbook is designed to help teachers at the college level develop courses of instruction which are designed to be provided on or supported by the Internet. Specifically, the book is designed to facilitate the following goals: Provide support for moving the instructional base to a many-to-many form of instruction rather than using the computer to provide one-to-many instruction. Create a virtual infrastructure where participants in multiple cohorts can learn, work, and develop in the business of teaching or develop learning on the Internet. Provide teachers with contexts and experiences required putting them in the center of their own growth, so they can experience for themselves what is required of students. Create a multigenerational superdocument related to

teaching on the Internet, which will live and grow across time increasing the learning and exemplifying products, which can be used to improve teaching and learning on the Internet. Assist in the development of personally relevant technologically based materials appropriate for teaching in the participants' disciplines. In the hyperbook we assume that most could do all that we ask by themselves given enough time. The assumption is made that all are teachers and that all could learn to do CML. Based on this assumption what we are trying to do is to stimulate the development process and to scaffold some behavior which would take longer if individuals had to develop it all by themselves. See http://home.okstate.edu/homepages.nsf/toc/isdhome .

Modular Approach: Each module is product based and participants have a choice of the kinds of products that they develop. These products are sharable and are posted to a multigenerational generational webpage attached to the module to which the product is related. Hence participants in later cohorts will be able to see and to build upon the efforts of previous learners. This insures that learning grows and the participants will have the benefit of the labor of the earlier participants. Because each module has several possible products, it is expected that learners will produce a wide range of example products in a wide variety of content areas. As generations pass modules will become larger as student work is added.

Description of Learning Formats: Modules would be developed in a variety of presentation formats so that participants would experience a variety of presentation approaches. It is unlikely that faculty will develop materials of a kind which they have not previously used. Therefore, modules should be available in at least some of the following presentation formats:

- Downloadable bookmarks to provide sequence among Internet sites (Site evaluation and uses summarized
- and integrated into teaching product development--collaborative activity)
- Hypertext with email response and student annotation—interactive activity
- Listserv distribution/communication to collaborative and cross disciplinary groups—collaborative activity
- Internet website development and distribution, individualized learning based on accessing resources listed
- on a website—individualized activity
- Streaming audio lecture and slide presentation (cooperative activity)
- Asynchronous threaded discussion (collaborative activity across disciplinary groups)
- Electronic bulletin board—Interactive activity (asynchronous)
- Listserv and email—interactive activity
- Synchronous discussion (collaborative activity within a single discipline content area)
- Synchronous discussion (collaborative activity across multiple discipline content areas)
- Asynchronous collaborative discussion (collaborative activity within disciplinary group)
- Course café discussion for affective/social learning (collaborative activity)

These formats for the modules provide multiple opportunities for participants to participate in active,cooperative, and collaborative activities as well as individualized activities as they learn.

Online Practice: The following is abstracted from what is presented to participants,"We view this and subsequent CML courses as a way to build a body of knowledge about practices in online learning. We are all pioneers in this area even though we have collectively taught for many years. As pioneers we can contribute to the development of good teaching practices for our peers and for those who come after us. The intergenerational document which we will create will form a legacy for those who follow us. You do not have to provide your work for others outside of your peer group in the course but

we hope that you will share with all teachers in Oklahoma the products of your labors which will make others better CML teachers in the future." See http://home.okstate.edu/homepages.nsf/toc/isdhome

Modules for the Development of Teaching on the Internet: Teachers cannot model what they have not experienced. Therefore we will provide contexts and experiences necessary to put teachers in the center of their own growth, so they can experience for themselves what is desired of students. Participants have a choice of modules in which to participate. The tasks involved hopefully will be authentic and meaningful to them. Each module will provide a choice of products, which students can choose among to develop. Products will have a real audience--this means that they should be shared with others who are teaching or learning to teach in CML settings and/or students. To do this we develop a multigenerational website where products can be posted so that others can build upon them.

Experiences in Active Learning: We all learn better when we are active in the learning process. This hyperbook provides only the beginnings of what is needed to be a good teacher in a CML environment. This is done on purpose. Each participant will have to be an active learner and find the activities needed in the discipline to make CML a good experience for learners. Active learning means more than just doing something under the direction of the teacher or program, it means thinking about what is being done in a metacognitive sense. This means reflecting on the thinking process and determining what is actually happening in the learning. We will try to assist all by providing the opportunity for active learning. Students will have to think about what they are doing and integrate it into what is already known. This by the way may be different for each learner.

Multigenerational Posting Requirements: The materials which participants create will be shared with others. The rationale here is that it is easier to create materials when there are examples to look at. We have tried to provide a few examples but there will be participants from many fields involved in the modules and we could not hope to create examples which all could use as models. Therefore we will use participants creations to help those who come after them. This is the concept of the multigenerational document or database. Each cohort will develop materials that will fit the needs of their particular courses. These examples will be linked to the appropriate places in the hyperbook so that others can visit them when they need to see examples. In some cases it will be obvious where materials will be used as examples. In others we will decide how the examples will be applied. We will try to notify each author as to where his or her materials will be used in the hyperbook. Some may be able to use these examples as part of their portfolio of education related materials. To insure that the examples are not eh]phemeral, we will mirror the sites of the best ones so that they are not lost. In some cases participants will post their own materials so that others can comment on them as part of the learning process. In other cases projects will be sent to a member of the staff for evaluation. In either case we may link the material to the hyperbook.

General Philosophy of the Hyperbook: The following directions are given to students, "this hyperbook is designed to allow you to explore areas of your interest which will help you to do what you want in Internet (CML) teaching/'learning. We want to show what you create to other learners so that later users will not have to recreate the wheel. Therefore we will ask you to develop the products you are interested in and we will use these products as examples for others later on. Most of what we will ask you to do will relate to product construction or to dialogue in discussions which can be captured and used later as source material.

Small Assignments that Build: Most of the assignments or product activities are designed to be limited in scope. This is intentional on our part. You need to get relatively rapid feedback and to know that your materials will work for what you want them to do. This evaluation will usually come from

peers, and occasionally from us. If we were to ask you to develop large products this kind of developmental feedback would not be possible. We hope that you will take this into account when you develop materials for your own students. When this approach is taken it is important that the products developed fit together so that in the long run you come away from the learning setting with materials which are sufficiently complete so as to be usable with others. Therefore we ask you to take responsibility for your learning. Plan what you do so that you can integrate the materials you are developing into a coherent package that you can use to develop and support a CML course. We will ask you to share your small products with others. When you have completed a course we will ask you to share it with all of us so that others can see how you integrate the components for the type of teaching which you plan to do. This will also provide an opportunity for you to receive peer feedback if you want it. If you post a completed course with us you may place a feedback form or a series of forms in the material and solicit feedback from members of future generations or cohorts of students using the hyperbook." See http://home.okstate.edu/homepages.nsf/toc/cml4.1.

Working with Others: Ask for volunteers to be web pals. Anyone who has completed more than "X" modules can be a web pal. Become a trainer and a mentor for other faculty. When they sign up for a module they must complete it within "X" amount of time. Have an " I want to start Module "X" form at the beginning of any module that requires groups to do the activities. This insures that there will be a cohort if they request to start and must wait until several others have signed up to do group work.

Overview and Directions: John Dewey (1916) lamented, "Why is it, in spite of the fact that teaching by pouring in, learning by passive absorption, are universally condemned, that they are still so entrenched in practice." But systems change slowly. You have a great deal of expertise in the development and conduct of instruction. We will not presume to try to tell you everything that you must know to teach in your content area from a pedagogical view. We will ask you to create many examples of content from your discipline, which illustrate how you would apply the principles that we have brought together in this hyperbook. We will ask you to share these examples with others so that they can learn from you. We will ask you to reflect on the examples of others and make suggestions that may make them better. When you view other's work you may have different perspectives, which are common in your discipline, which may be new to some of your colleagues in other disciplines. Sharing these insights will increase all of our instructional knowledge. We do not claim to know all that is needed, but we will try to share our instructional design expertise and some of the ways to use technology which you can use with your content expertise to improve learning for students.

Scaffolding Your Development: In the hyperbook we assume that most could do all that we ask by them given enough time. The assumption is made that all are teachers and that all could learn to do CML. Based on this assumption what we are trying to do is to stimulate the development process and to scaffold some behavior which would take longer if individuals had to develop it all by themselves. Collaboration allows members of the group, all who are experts in various areas to share their expertise and to scaffold each other and facilitate the development of teaching materials and techniques.

Peer Collaboration Processes: Much of what you will learn in CML will be from your peers at your own and other institutions. Peer collaboration is necessary when learning is interest based and text information is not encyclopedic. We would hope that you would share your expertise with your peers and that your peers would share with you. This implies that you should read the question bulletin board frequently and answer the questions of others when you can. Remember that what may be easy to you may be difficult to others and vice versa. When others send you email about their products try to help them. You will learn a lot trying to teach what you know. When others send you email about your products, post the comments that make the product better so that others can share. If you are not

comfortable posting the email make the changes and then tell others what you have done. Generally be collaborative and share with others. There is no official or organized competition between us as peers. The more that you help others the more you will learn and the more people you can learn from when the course has ended.

Evaluation of work: One of the keys to releasing students to take control of their own learning is to teach them how to evaluate what they are producing. You already know how to evaluate teaching materials so we would not presume to try to teach this to you. However when you work with students you may want to follow the following procedure: Ask the students how they would like to have their materials evaluated. Generally they will not be able to create a long list of criteria which might be used to do the evaluation. Brainstorming criteria will provide them with a list of alternative criteria from which they can choose. Then they should be allowed to pick criteria for product evaluation. When this has been done several times, for different products, you can start asking them to use one or two criteria which you want used as well as the criteria which they negotiate for. This can be done in the form of a contract. Students should always be able to negotiate for alternative evaluation criteria if they want to. This gives them some control and responsibility for the product. If the evaluation is totally external the student has no real agency in determining the product components and therefore little responsibility for the outcome.

Peer Evaluation: A more difficult form of evaluation is peer evaluation. We all do this when we share articles we have written with colleagues, for review prior to submission for publication. Students are unlikely to have had this opportunity and will have to be taught how to evaluate others appropriately. In a CML environment evaluations in print are taken more strongly than those given verbally or those hand written on a paper. Therefore students should be taught to be gentle when they present critical comments. A constructive comment should tell the student what is wrong, why it is wrong, and how it should be fixed. Examples of the fix should be provided to assist the student. Constructive comments should be made in private, in CML by email, and not posted to a bulletin board or other permanent record. Some times we will ask you to comment and to send your comments to us as well as to the author so that we can evaluate your comments, however this kind of comment too will be private and sent by email. When you receive comments from us or from your peers you may post them if you think that they improve your product or you can implement the changes without opposing the peer comment. This is up to you. Your final evaluation will be to have your work on display for peers. This is the form of evaluation that we provide for you. If you feel that you need for peer evaluation prior to permanently posting your work with your name on it, call on your peers for assistance.

Hyperbook layout: New learners will, we hope, enter the book from its' homepage. The homepage provides a description of the book, a linok to a module TOC, a link to a searchable detailed TOC, a link to a variety of possible one credit course configurations, a site map link, a link to student comments about the interesting module configurations by previous students, a link to student created examples and questions, and a link to a FAQ page. There is a link to enrollment processes and contact information.

Printing Version and its URL with Hot Link: Each module or set of modules (making up a larger course) will have a printing version that can be copied without the illustrations. If your computer is older or your Internet Service Provider (ISP) provides slow services you may want to work from the printing edition and open the links you are interested in using your Internet browser.

Navigation in the Hyperbook

* **Description of the Index:** Indices are usually fixed. They are created after the text has been written and are arranged in some logical order. We are in the process of creating an index for this text. The plan is to develop the index and then revise it twice a year. This means that the newest material which students may create and sent in to be added to the book may not be represented, immediately, in the index. We will however link new material to the table of contents in its module so that you can see what is available if you link to the right module.

* **Table of Contents for Each Module:** Each module will have a table of contents (TOC). This will be on the first page when you link to a module following the title and the brief description. The TOC will contain all of the bold and underlined titles in outline format and each heading will be internally linked from the TOC to the heading so that you can immediately access any segment without scrolling through the text if you so desire.

* **Navigation Internal links-module:** In each module pages link to the table of contents, the preceding page, and the next page. These links are on the navigation bar. Underlined words are hot linked to the book glossary (the back button on the browser is used to return from the glossary to the module. Blue URLs are linked through the browser directly to the pages they represent at either local or remote locations. There are also links between sub-modules (major components of the module).

* **Links module-to-module:** Navigation between modules is done through the end navigation bar (next module), through the table of contents, through the modules listed in the introductory module to the hyperbook, or through the module headings in the syllabus. The modules may also be accessed through the homepages table of contents at http://home.okstate.edu/homepages.nsf/toc/CMLHOME. And through http://home.okstate.edu/homepages.nsf/toc/isdhome.

* **Pictures in Text:** The following directions are given to the students,"the first pages of many sites have been captured and inserted in the text of the hyperbook. These are presented to pique your interest and to draw you into exploring these and similar sites. It is unlikely that you will want to go to all of them but you should visit all that you are interested in. After you have visited the various sites you will have more to share with others in collaborative settings as your develop collaborative products. The hyperbook is a performance-oriented hypertext that tells you the options that are available and the actions that are necessary to execute them."

Things we have Learned in Asynchronous Hyperbook Development:

- Do not leave notes on the website on things that have to be done, e.g., **make this link hot.** This really confuses some students.
- Have all applications up and running before the class starts. We had a bad experience with a listserv that did not work and half the class dropped.
- Make all the directions really clear, field test them with potential students.
- Never believe that CIS will/can do what they say they will do. If the application is not up and running do not say that it will be.
- If you use a listserv for communication, have it up several weeks in advance of the course so you can talk to students and introduce them as they enroll.
- What ever you want students to do, even if it is really easy, do not believe that students will think that it is easy. Some will barely be able to turn a computer on.
- Do not start by expecting as much work as you would in a regular class, when students see what they have to do, plus learning how to use a new system, they will think it is too much. Or, expect a higher than normal dropout rate.

- It helps if you tell students in detail what you are trying to do. See what we used at http://home.okstate.edu/homepages.nsf/toc/isdhome. This was not enough event though the syllabus was thirteen pages in length.
- When using a modular approach and providing choice, strongly suggest that they read all of the modules. This increases understanding and fosters collaboration. They will also know what their options are.
- Teach them how to subscribe to an ISP.
- Have a How Do I telephone help desk several hours per day.
- Plan more time at the beginning and end of the semester. Some time will be needed during registration if you use online registration.
- Send each enrolled student a postcard. Have them put their email address on the card and return it. This insures that all are on the listserv or email message list.
- Say something about Deborah Tannen and the male fear of asking questions and directions. Be sure that they feel it is Ok to ask for help, in a private way. Have them call if there are questions.
- Have an Internet question bulletin board where all can post questions of general interest or to ask about technical problems. In the introductory module have each new learner respond to each new posting to get they used to talking and posting to the correct places.
- Recommend that those who are sophisticated in web design already should not use frames in instructional materials because so many cannot use them with the browsers which they use, or require a specific level of a specific browser.
- Have a bulletin board or part of a bulletin board for each module entitles "Neat Related Ideas". Post materials/ideas that are not generally posted and archived.
- Do an outline of tasks needed complete the course. Mark the modules needed to do it as an alternative track. Do some kind of mastery checklist based on the objectives. Tell students to choose what they want to learn how to do. Have a validation spreadsheet to make sure that the required postings and messages with products have been sent.
- Have a class sign up sheet or schedule for modules that need a collaborative group. When five have signed up, form the group and have them start.

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