

Who wants to be a teacher?
An exploration of the theory of Communal Constructivism at the chalk face.

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Abstract

In this paper we describe the application of a new theory of communal constructivism where learners build knowledge not only *with* each other (social constructivism) but also *for* each other. We developed the theory while designing and implementing a masters level course (in IT and Education) and this paper explores the practicalities of applying the idea at the chalk face in an Irish primary school. Students in the school took part in a research project in which they made extensive use of ICT, peer tutoring and other aspects of communal constructivism. In particular the roles of student and teacher were deliberately blurred with the children tutoring not only their peers but also their teachers.

As reported in the paper the learning outcomes have been very positive. Rather than passively passing through their school as water through a sieve these students have travelled as a river, actively enriching the experiences of their peers and the whole school through their own learning. The student materials are documented as a record of their own achievements and a gift to others.

From the viewpoint of teacher education, the best result of all is that students have had a valuable internship in teaching as a profession and thus communal constructivism may support an increase in understanding of both the difficulties and the joys of teaching.

As part of our application of the theory we have written this paper in such a way as to embody the multi-vocal aspect of the theory of communal constructivism. The primary schools students are included as authors, and not mere data subjects, and explicit expression is given (as indicated by changing fonts) to the different voices of each of the authors, *voice 1 - teacher/postgraduate student, voice 2 - academics, and voice 3 primary school students.*

Finally the work of the primary school students, which is an integral part of this paper, is available at the following URL.

- www.geocities.com/minimeie2/

Introduction

Voice 2¹: We believe there is a need for a new theory that will encompass much of the recent developments in exploring new ways of learning aided by advancements in ICTs. We propose the idea of communal constructivism where learners build knowledge not only for their own benefit for also for that of others [Holmes 2001]. Rather than passing through the course as water through a sieve students are instead challenged to leave their imprint in the course, enriching it like a river running through a valley. We believe that this opportunity of participating in enriching the course provides students with a positive experience of education in that their work is valued and their motivation for learning is increased. Moreover, we would argue that there is a positive effect on students' traditional academic achievement. In particular we believe that the role of the learner and teacher are fluid. As lifelong learners we are always in the process of learning from others and what we hope to also stress is that in the same we should also be lifelong teachers – needed by our family, friends, classmates and community.

The theory emerged from the development of a masters program in IT in Education, at Trinity College Dublin, where the course informed the development of theory that in turn further developed the course. The theory was a result of our changing views on what education was and could be. Further testing was needed in more neutral environments. This paper recounts the experiences of one primary teacher on the mater's program, and her students, when the ideas at the heart of the M.Sc. in IT in Education program were deployed in her school.

Voice 1²: I teach in an Irish national (primary) school in a disadvantage area. We have approximately 300 pupils and 17 members of staff. The school has a computer room and with 15-20 computers. The school includes an Autistic Unit that has 11 students, 2 special needs teachers and 4 classroom assistants. The school is mixed until the age of 7 when the boys move to a Boys' National School (across the road) for senior infants classes and the girls move across the courtyard to continue in the same school. (I carried out this research in the 5th and 6th classes of the Senior Girls' School.)

An audit on the use of computers in the Senior Girls' School was carried out in November 1999 and concluded that the computer room could be more widely used and identified teacher training as the key area to be addressed. There were a number of training courses offered to staff but many teachers found training difficult for a variety of reasons including time and lack of training suitable to their particular class. A new approach was needed that would allow for a tailoring of the lessons and the times to suit the teachers and the learning needs of their pupils.

I was eager to see if some of the ideas Bryn & Brendan had explored on the M.Sc. program would be applicable to other courses and to other age groups. In particular I believed that instead of using outside experts to train the teachers that the senior students in the school might be able to provide the needed instruction. They were

¹ Bryn Holmes & Brendan Tangney are academics in the Centre for Research in IT in Education.

² Siobhan Meehan – student of the M.Sc. in IT in Education and Teacher at St. Brigid's Primary School.

enthusiastic about the scheme to allow the older students to come and teach skills in the computer class time.

In the work reported here, my students from my class were involved in teaching Story Maker, Word and Hyperstudio to other students and to my fellow teachers.

Voice 3³: Hi! My name is Justyne Smyth. I am teaching Mrs. Savage's class. There are twenty girls in her class. I taught them story maker. It was their first time using it. All the girls listened to what we said to them. I corrected a few girls. They learned how to put speech bubbles in. Elaine, Kym, Lisa and I taught them how to move the people around. I really, really enjoyed it. They are very intelligent for second class. It was great for the girls, great benefit. Mrs. Savage asked us to do again it next week. I am really looking forward to it. If I am a teacher I would teach my class it and they could see if they would like to be a teacher too.

Project #1 - Story Maker

Within the masters course students are involved in a process of constructing not just knowledge but indeed part of the course. They work extensively in groups and their assignments are projects that are designed to build into a large-scale research project with a focus on designing something of real benefit to their area of interest. As a result, all assessments are based on a portfolio and formal examinations have been dropped. As lecture material is made available in advance, lecturing time is an exploration of the concepts with hands-on work, discussions and student presentations. Peer-tutoring and mentoring form a large part of the course and 2nd year students mentor the first year students and those that have graduated are invited back to run research seminars. This provides our graduates with an apprenticeship in university lecturing. In the first year, small teams of students take over one lecture and teach their peers. Their brief is to reflect in their teaching some aspect of theory of ICTs in education. There are positive effects for the students as a result of the intense discussion that takes place in the planning meetings but also for the academics involved in terms of understanding how the students were developing.

We hoped that the feelings of accomplishment and the support of the strong peer group, as well as the value placed upon their project work would provide for the motivation to go above and beyond 'an assignment' and instead encourage our students to take the ideas we were experimenting with and adapt them so as to make a real difference in learning environments outside the university.

For part of contribution to the master's degree Siobhan chose to teach Story Maker, not just to her own class but, then in an interesting and dynamic way, to most classes in the school.

First I taught students how to use Story Maker in their own class and then after a number of sessions, when the children were sufficiently confident in their own ability, they adopted the role of peer tutor to other classes in the school, namely 2nd, 3rd, 4th, and the Special class. The 1-1.5 hours per week training sessions were recorded using

³ A pupil from St. Brigid's Primary School.

video and a questionnaire was given to the children after the first and the third session using Story Maker. I selected Story Maker as it was easy enough for students to learn quickly and thus soon author their own stories and flexible enough to fit into the existing curriculum namely history, Irish, geography and English.

In the beginning of the project the children worked in pairs in the computer room, and before going to the computer session they were set a task: they were to create a story on a topic studied that week. Students were given an initial questionnaire that highlighted some of the functions they were expected to master. This gave them some specific achievable goals. The pupils explored the other functions available on the programme such as movement and sound.

The children worked well with their new partners for the next two sessions and then changed partners. Before the 2nd session the children involved were videoed with their partners discussing their storyboard and what they wanted to create. When the pupils returned to the classroom after the session they watched the video and assessed if they had achieved what they had set of to do. Their only complaint was that they could not find objects suitable for their story. Knowing that there were being videoed and that they would be assessing on their performance by other students was a strong motivation for them to succeed.

After the 3rd session, the students were given the same questionnaire but this time there were 9 extra questions. This version of the questionnaire indicated to the pupils that new functions and applications were available to them, ones they had yet to discover. This gave them the impetus and incentive to explore them in session 4. After the questionnaire we heard some pupils call out “Who knows how to record your own voice?” and “Who can delete a scene from the Story?”

Overall the whole class had achieved almost 100% of the targeted skills and had improved their academic performance in history at the same time. I observed and monitored the peer support and interaction, which confirmed that the second part of the study that focused on peer tutoring would be feasible. The pupils were now ready to work in teams of 3 peer tutoring other students on the basic Story Maker Skills. At a meeting of 2nd, 3rd, 4th and Special class teachers, a three-week programme was drafted and the Story Maker teams were given a specific class to peer tutor.

I⁴ liked helping the girls in Mrs. Smith's class at computers. We did Story Maker..... I was glad I got to help Mrs. Smith's class because they were lovely and good listeners, it made my job really easy. I helped them do a picture of their Irish play, I knew what they were going to do before hand our teacher told us. I knew what backgrounds and objects were suitable which was really helpful. If I didn't have other girls from my class peer teaching I wouldn't have been able to help every girl. The girls from my class were Jessica and Lyndsey. I really enjoyed peer teaching.

I taught the girls the basic steps but most of them knew them. Some girls listened but others just keep laughing and messing. I had to correct some pictures. Some girls used second pages at first they didn't know how to do it but the girls and I showed them. Some people used speech bubbles. I had to edit some words because they were wrong.

⁴ A pupil from St. Brigid's Primary School – give name???????

Some girls did it in Irish so I showed them that you press Alt gr and what ever letter you needed like some girls' backgrounds. The stamps some girls picked were cool and some girls let their imagination run wild but others stuck planets on the beech. I showed girls how to put sound and movement into it. It was good for girls. They really loved it and they showed it in their stories. I really enjoyed being a peer teacher. If I were a teacher I would use this programme to learn the lessons in more detail. I would still give this Software 10 out of 10.

Michelle (the voice in the previous paragraph) suffers from the same problems in describing her experience as we do in writing this paper when she writes that 'some girls' did not know how to use the speech bubbles but that 'the girls and I' showed them how to do it. We lack words for students who teach each other and their teachers – be it at primary or 3rd level! The words teacher and pupil seem to lock in a unidirectional flow of information and thus the same word is used for both.

The contrast between teaching the basic skills, which the pupils already understood, and a new and immediately applicable piece of information, such as inserting sound, is evident from Michelle's description. If it were up to her ICTs would be used to extend the curriculum. Her classroom experience mirrors the larger world and the choice between teaching about technology and with it.

The peer tutors were very positive from the outset, it was seen as an enjoyable way of revising previously learned skills in a fun way that did not look like schoolwork.

The pupils in my class worked together as a team throughout the entire project and willingly stayed back after school to help type up their evaluation report. Together we created a web site with some of their evaluations of Story Maker and their thoughts on peer tutoring.

Pupils took the URL home and encouraged their parents to look at the project. As the area is a disadvantaged one, home-school links are not always as strong as they could be and thus any project that parent's take an interest in is beneficial to the pupils. We were, therefore, delighted to receive an e-mail from one of my pupils stating that she and her parents browsed the site and were very impressed with it.

In our assessment of the peer tutoring pilot scheme we found that it heightened the self-esteem of my pupils and also motivated them to learn, findings similar to Topping and Bamford's (1998) study where they observed that passive pupils became extroverted and quiet pupils more verbal. I also observed that levels of concentration on computer applications increased considerably.

From my own observation gains seemed to accrue in the cognitive, social and affective areas as well. However, it would be difficult to evaluate in quantitative terms the full range of outcomes for either peer tutors or the pupils of the other classes with the resources available to this study. It is hoped that future studies might explore the benefits of the initiative in each of the classes that were peer tutored.

Perhaps the most telling evaluative indicator was the frequent and repeated requests to me imploring that I ask Mrs. Savage or Mrs. Smith "Does she want us to teach her class this week?"

The fact that the peer tutors recognised the value of their peer tutors when working with the other classes further reinforces the collaborative and cooperative learning environment of their original class and provides a role model for students learning together in the class they tutored. Siobhan's use of the questionnaire enabled her to check students' knowledge and allow them to measure their progress. At the same time it was used as a way to show her students that there were areas for them to explore, it thus effectively functioned as a hint sheet for discovery learning. A classroom atmosphere that supports collaborative learning is essential here. Indeed one of our influences is the Japanese classroom where there is a strong culture of collaboration (Holmes, 1999).

All peer tutors stressed both the pleasure of their students' skills acquisition, the motivation that this learning provided for their students and reflected on the positive impact that had on their own experiences being a teacher.

Even after the summer holidays the students were still enthusiastic about their work as peer tutors. When students were requested to write about 'teaching Story Maker last year' their comments included:

I thought it was brilliant because I like learning and teaching other people for their own education. Sometimes they did they created their own picture as opposed to the teacher's! Many of the little kids love computers just like my classmates and I.

It was really cool I love sharing my experiences with the other girls. If you do Story Maker for a long time it gets boring (not the teaching though) just doing it, but I could forever teach it.

The pleasure in the innovation in others and perhaps the recognition of the impact of the older student in that process is highlighted in these remarks. Siobhan's hard work in creating the right type of learning environment was obviously paying off. We also enjoyed the reflections on the IT (it gets boring) and Education (I could forever teach it) and felt that we added an extra dimension into the equation as we could forever learn from such students.

Looking at the comments of the students in my class, the result was an overwhelming positive experience for the peer tutors. In response to another question: "What was the most exciting thing about computers last year?" I found that 14 out of 19 students considered Story Maker as the highlight of their year.

The most exciting thing is that you can talk over the Internet and I learnt about Story Maker and how to make stories on it.

Teaching Story Maker was good and great fun. The girls really liked it.

Last year I thought Ms. Smith's class Story Maker. As I was teaching them I learned new things about Story Maker like the screaming sounds.

It's like the computer has a brain and it helps you, it can type, help you spell and lets you play games and talk to people all over the world over the internet.

Project #2 – Peer tutoring in Hyperstudio and the development of learning resources

To build on the experience with Story Maker what was needed was a more flexible tool that would allow students to pursue their own visions of their work. For this, students needed to move beyond a focus on learning basic skills. (I could see from Michelle's comment that the teaching of mere skills did not work well as a focus for teaching. An initiative to teach Microsoft Word to other classes had also proved unsuccessful as it was too low level for the students.) I decided to choose Hyperstudio as it would allow students to move their work onto the Web and was easy to use and had a variety of functions.

Given the time of the project, and what I hoped the Senior Girls might be able to achieve, I also decided to focus on reciprocal peer tutoring. Reciprocal peer tutoring would involve the pupils in my own class and they would change the roles of tutees and tutors on a weekly basis. I divided the class into two and taught each half aspects of Hyperstudio. In Lesson Two the tutees of the first lesson adopted the role of tutor: experienced, responsible, knowledgeable and self confident. They took their role as tutors seriously and on reaching the computer room initiated the class without any prompts from the teacher, such was the enthusiasm to impart their newfound knowledge with their partner and friend. The task on hand was similar to lesson one: create three cards one red, green and blue.

The tutors were aware that they were not allowed do the task for their partner merely guide and prompt them when they were in difficulty. In addition to the previous request they were asked to encourage and praise the tutee when they succeeded in creating a card in Hyperstudio for the first time and also for any other achievements throughout the tuition period. The teaching mantra of "pause, prompt, and praise" was introduced informally to both sets of tutors.

Siobhan has succeeded in providing a real impetus to subject mastery. This was of great interest to us as the underlying idea of the Masters course is of course the mastery of a subject. Motivating students to take the time and trouble to master ICT in Education is key to the success or failure of the course. Traditionally students who did not master a topic would be judged as having not succeeded (say in a test) and often left behind when the next section of a course built on the last (such as angles in geometry being taught as a grounding for the study of triangles). When teaching for the production of knowledge with and for peers the results are different as pupils return to the lesson to make sure they have mastered the topic as they will have to shortly teach it.

This demand for learning has been an important motivating factor in the high levels of mastery in Siobhan's classroom and in our own postgraduate ones. Students in several cases taught variations of the lessons to their own students they had learned the night before in our class. More important of course was an exploration of the whether or not the changes in the way we were learning on the course was transferable.

Motivation

When students realised that they hadn't achieved maximum points in the test, they checked the grid which had an "X" beside the area they had got wrong and strived to remedy the situation before the end of the class. This made peer teaching an effective form of teaching as both the student teacher and the taught student focused on mastery. In fact comparing those who understood from direct teaching to those who were taught from their peers only at two points did the traditional method of teaching surpass the peer teaching method and then only for an hour or two. In the diaries, the tutees preferred to have the close contact and focused attention that the peer tutoring brought:

It's better to have a partner beside you because it is less frustrating when the teacher is beside you and the other girls are calling teacher, teacher, teacher, it's hard to hear the teacher and concentrate.

As well by teaching the material to others shortly after learning it, the peer teachers saw their own learning turn into knowledge. Another good sign was the willingness of students to move beyond the learning limitations of the classroom and push to learn more. After each lesson, extra experimental stacks were found in the students' folders. They had obviously been experimenting with new features and rather than sit about when finished they choose to head off into new areas of learning.

The peer mentoring had brought out the best of discovery learning. It may be that peers are much more able to support criterion referenced success than is a teacher. The pupils reflected on their progress in their diaries. Their writings reflect their desire to learn as much as they could and effect their partners had in motivating them to do so.

I concentrated really hard cause if I didn't I would have let Fiona down.

I concentrated very well during the lesson. It was easy; it was not hard at all. I would love to learn more about Hyperstudio.

I paid loads of attention because if I didn't I'd let my partner down.

The tutees were impressed by how much and how fast they learned.

Kym showed me at great speed. It was great I didn't find any bit difficult or frustrating.

I think I will work well with Justyne because she explains it well.

Michelle was a good teacher she was very patient with me, she went fast enough. Amanda was good; she didn't go too fast or too slow.

Building for Others

As the basic tenant of communal constructivism is that learners not only learn with others (social constructivism) but also for others we were very interested when we heard that Siobhan had asked her students to create work for other students at St. Brigids.

All the projects would be created for others and can be accessed by future generations of pupils in the school. The students of the Autistic Unit were each given CDs for their computers. The unit has its own computer in their classroom.

There was an air of contentment and satisfaction about what they achieved and the other lessons went as smoothly. Once they had the basic skills necessary to produce something with I asked them to start on a project that would benefit other pupils in the school and on any subject they choose to do. The pupils were invited to explore their own strengths and area of interest.

Bonjour, Sandra and I decided to do a project on French numbers. I go to French classes and I have learned the French numbers. I think that the Un, deux, trois project will help those who haven't gone to the classes, they can now learn the numbers. We are now doing a colours project with Sidonnie and I'm enjoying it.

Three of the groups wanted to do a project for the autistic unit as they minded them in the yard at lunchtime and have built up a strong relationship with them. This interest motivated them to spend hours of extra time researching and developing the site for such students.

The four of us decided to do a project on the Autistic Unit. There is an autistic Unit in our school, some of the sixth class girls mind the autistic children in the yard. Kym and myself decided to do a fact box about the boys in Gino's class. Jessica and Lyndsey decided to write stories for the boys including their favourite characters for example Pokeman and Bob the Builder. We're going to give Gino a copy of our project for his boys to use in class. We all really enjoyed doing our project.

Another group who enjoyed the television programme "Who wants to be a Millionaire?" so much that they created their own programme but using questions based on their English Reader and Geography book.

Gemma and I started the project over three weeks ago. We made up questions from our Geography and English Reader. Anybody who has the books "People and Places 4" and "Golden Sunset" they should be able to get £1,000,000. The half million and the million pound question are difficult!! The "Who wants to be a Millionaire" project was long, long project and at times we wanted to give up at £64,000 but we're glad we didn't.

In order to add an element of drama the Hyperstudio awards, which were announced (around the same time as the Oscars in Hollywood) featuring the following categories: Best project, Best foreign project, Best Special Needs Project and Best Irish Project. Each of the projects were assessed and judged by a set of criterion compiled by myself with the help of some American schools on-line who were using Hyperstudio. The checklist was explained to the students and judging was done in an

open forum. The judging went beyond simple technical competence and also focused on focus and objectives.

The biggest test of the Hyperstudio projects, however, was their use by their peers.

Dia duit, ta an focloir as leabhar Stor Nua

Elaine and I did our project based on our Irish reader. We decided to make all the T words easier by putting pictures with the words. We both learned a lot doing this project. The girls in the class revised for their test on Friday using our project!

Findings

This study is a small in-depth longitudinal work but we believe offers valuable insight into the effects of using ICTs to support learning for as well as with others. We feel that the explorations of communal constructivism at the classroom level has shown that the application of many of the features of our M.Sc. to an Irish Primary school has not only been possible but also rewarding.

The findings of my 5-week study show that I.T. in the form of Story Maker has enhanced pupil learning in many curriculum subject areas within their own class. The majority of pupils improved their score in the subject (such as history) that they used Story Maker to explore. An opened ended software application, such as Story Maker, allowed students to expand the national curriculum and make a subject their own.

Taking into consideration that pupils had only two months working with Hyperstudio once a week for 1-1 ¼ hours to produce their entries, the results were outstanding and the awards gave them an opportunity to reflect on their achievements. When I stand back and review my work I see that the pupils of my class have a deeper understanding of I.T. and recognise that I have helped bring them to this deeper level of understanding.

The recognition of the value of their work was a powerful motivating force. Students produced work they were proud of their work to produce something of value for their peers and for the younger students in their school. They kept on working beyond when they might normally have given up or gotten tired of their projects. Not only was their knowledge needed by younger students, and their peers but also the projects they created are being used as learning resources for students. Their in-school teaching had a positive impact on their confidence and a direct teaching.

Of all the findings the most powerful and positive was the pleasure the students took in teaching others.

One of the great advantages of Hyperstudio is that by simply downloading a plug in from hyperstudio.com these projects can be accessed by students all over the world. The pupils in the class can look them up even though they are no longer in the school (being they were the graduating class this aspect of the project is particularly important).

I think the most beneficial result of the whole project was that they were worked so well together no resentment and antagonism. They also showed more empathy in

their dealings with their partner. They were aware that I was looking for evidence of "Pause, Prompt and Praise" in their teaching and I observed many instances of the method of practice.

The traditional discrete roles of teacher and student are blurred. In exploring Siobhan's study we were instructors within the university setting but we were also able to learn from Siobhan and at the same time be students of her students. Our findings are also her findings and her students' findings.

We learned that the voices of our students and in turn of their students are important to the development of our ideas of teaching and learning. They contributed and evaluated our theory and we saw through them that ICTs skills cannot be properly taught as isolated basic skills but instead as stepping stones to develop and then teach more advanced skills with an aim to developing something that would be of use to others. We learned from their thoughts and reflections, the product of their work, and their beliefs and reflections. We believe that they also gained knowledge of their own learning as they documented their learning for others.

Conclusion

Many of the aspects of communal constructivism are not new. It is the synergy of the variety of different successful techniques and the use of ICTs to support the learning that has brought them together.

Peer tutoring. The use of peer tutors to teach ICT skills was novel in St. Brigid's school but peer tutoring has been used informally throughout the years in the Irish primary education system where there are still a large number of 2-teacher schools. Enormous creativity is required in timetabling subjects and extensive use must be made of both group project work and peer tutoring. Economies of scale argue that such schools are not viable units but the power of ICTs to extend the horizons of such schools is seriously challenging that assumption. Rather than providing a poorer learning environment, the ability of the students to aid each other's learning and to capture the processes and products of the learning to aid others can be a powerful tool in the smallest of schools. Thus learning from one year to the next is not lost but instead used to build a body of knowledge with the class, school and community.

Publishing. The use of ICTs to support the production and not just consumption of information is important. Although student work has traditionally been displayed on school walls, or storied in home in boxes under beds, the development of the Internet and of more sophisticated databases is making possible the capture and dissemination of student work in ways that increase its value to the students and to others. The development of the learner centred learning materials on CD Roms for the students of the Autistic unit is a good example.

The materials were designed with each student in mind and focused on the students' specific interests. Tailored materials so costly in time and resources are beyond the reach of most teachers but fellow students not only have time but also the willingness to explore and develop resources for individual learning styles.

Roles. Teachers, and those who teach teachers, need also to be part of the process. We believe they should be involved in a process of constructing knowledge and that construction is a communal affair. Group work in schools, in college and among academics is important, we should not only working in the peer group but across the various institutions and age levels so that students work with, teachers, who work with lecturers, in such a way that all are teachers and learners in the process of building a richer community. This paper is an example of such collaboration. There is a need for a different forum for academic work (such as the Web) and a review of the concepts of first and second authors. What is needed is a way to document the contributions made to knowledge building rather than trying to simply rank them. This way those that are not part of the formal academic community can still have a role in the development of the field not as voices reported by others but in their own right. Students have a right to be needed by the profession.

Assessment. Assessment should support a richer learning product than exams, through a focus on portfolio work and through measuring learning gains over longer periods of time through continuous assessment. Not only did Siobhan's learning checklist provide a way for her to see what students were learning, it provided an impetus for them to check their own learning and improve.

Teacher training. Communal constructivism supports a teaching apprenticeship for all those who come through the school system. The profession would benefit from a rich pool of people who understand the concerns of teachers and support new initiatives. No other profession is so familiar to all citizens we believe it should also be the most valued.

From a students' email:

I thought it was great how you explained step-by-step how to use Hyperstudio. I told my Aunty Mary about the Website and now she's showing her children how to use it, and they think its brilliant. Best of luck and see you on Monday,

Fiona Forde.

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