# *Colline*: A Multimodal Collaborative Platform Combining Mobile and Touch-screenbased Interfaces for Editing a Newspaper

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**Resume**:
The *Colline* System streamlines the work of an individual journalist but also when more journalists are collaborating, of a single person or the communication department working for local authorities, for a civic journalist, a citizen journalist, etc.
The user interface brings together the content from different sources and media, but will also diffuse stories along various outlets.
By combining the benefits of a collaborative interface with the power of semantic web and Web 2.0 integration into the form of Web 3.0., it enables a user friendly way to collect information and to produce a newspaper. The functionalities are taking advantage of the research done in the man-machine communication and in the field of the information sciences.
*Colline* is based on user needs studies performed during two years within editorial staffs of local, regional and international newspapers in France, Germany and in the USA. It based on a framework of a scientific cooperation with the DFKI (German Research Center for Artificial Intelligence). *Colline* is an ongoing project, which is validated on an international level.

***Keywords*:** collaborative editing of newspaper, collaborative environment, web 3.0 interfaces, touch-screen,

## 1. Introduction

The information technologies, the web 2.0 and web 3.0 interfaces bring together the social and community aspects, like the folksonomies with the semantic web (1). Data can be read by the machine with the help of the semantic web for effective retrieval of commercial, scientific, and cultural data in a universal medium. Semantic web provides new opportunities for semantically-enabled user interfaces. The design of interfaces should be human-centered and requires interactive functions. The understanding components relies on semantic web data structures in order to transcend the traditional keyboard and mouse interaction metaphors, and provide the representation structure more complex, collaborative interaction scenario, that, most exciting, may combine mobile with terminal-based interaction and the physical with virtual world.

In this paper we discuss a combined mobile and touch-screen-based multimodal Web 3.0 interface which brings together mobile scenarios, speech-based interaction, and touch-screen implemented in a collaborative environment for the editing of a newspaper.

They change radically the work practices in each field, and especially in the field of news publishing. Traditionally, the instance of information production has many actors (journalists, chief editor, etc.). Each one has a defined role.

The instance of production has 5 main roles: 1) *information seeker* (information retrieval and management of information sources, like news agency, reporters, other journalists, civic journalists), 2) *information provider* (selects information regarding certain criteria, etc.), 3) *transmitter* (organization of the selected information regarding the audience), 4) *commentator* (writing process), and 5) *moderator* (animation of debates with social actors).

The information content is constrained by the political influence, the advertisers, etc. Today, with the impact of the information technology, a new player invited himself to the publishing process: the non-professional journalist (citizen journalist, bloggers, etc.). This new constellation influences the work practices of the journalist. He has to take into account the opinion of the citizens and must produce attractive multimedia information in real-time in order to keep the interest of his readership.

The instance of production and the journalist have several tools at disposal for producing a newspaper, but none of them streamlines the work of an individual journalist, and also when more journalists are collaborating together. For this reason, we propose a Collaborative intelligent Newspaper Editor (*Colline*) of combined mobile and touch-screenbased multimodal web interfaces. In the following, we will present our methodology which leads us to a research-action, then the results, and finally the difference between *Colline* and the existing systems.

## 2. Context of the research

The introduction of Internet in the organization has changed the work practices and the management production process of the traditional news agencies and news publishers. We study how these changes impact the role, the status, the neutrality, the working process of the journalist, and his relationship with the audience by using the theory of dispersion developed by Foucault (2, 3, 4).

The readership is becoming more critical. It wants to participate in the debate, to have information in real-time. The added value of the journalist is to collect all the information from different sources by taking into account the opinion of the audience from blogs, forums and captures the tendencies. He out of selects and verifies the information, write them with a journalistic style, and have an ethical behavior.

For collecting his information, he can either interview eyewitness or use the pictures that have been sent to the news desks by a reader. He also needs the opinion of his audience. In the past, he captured the opinion of the readership with the help of radio broadcasts, radio phone-ins and manages the discussion. Currently, the same procedure happened with blogs linked from a news site or news pages linked from blogs. He can share knowledge with his network. This network helps him to find the expertise to improve the quality of the information.

For decades, radio and phones has allowed the audience to participate in the debate and share opinion through mass media. Phone-ins shows were a format for talk radio with regular callers for extending the discussions. By translation, we can observe the same phenomena when communities work with bulletin boards and blogs.

Podcasts and video blogs reflect the opinion of the audience. They are stored in the public space and not only by one broadcaster. It was a good opportunity for news agencies to integrate the opinions of their readers, listeners and viewers in new ways.

The editing process is a powerful activity, aimed at achieving some well-defined goals. That means that the subject of the article that must be produced must be analyzed for the purpose of setting goals, which, when achieved, will solve the problem. The analysis reveals the constraints on accomplishing the goals. Then actions that may lead to accomplish the goals must be devised. They must be a way to predict and evaluate the potential of each action to accomplish the goals. The executing of these actions requires the participation of other persons (journalists, editor, experts in a domain, news agencies, citizen, etc.); there must be a way for the journalist to communicate with his partners to get their opinions, agreement, and assistance for each of the above activities.

Analyzing the subject under writing, setting goals, devising actions that might accomplish them, evaluating the efficacy of these actions, and communicating with others involved in the process is what the journalist does.

Computers, when well programmed can follow a line of reasoning to its logical conclusion. They search through and correlate facts in the files that are stored. They present the results in the form most suitable for the journalist comprehension: in textual reports, tables of numbers, charts, graphics, even in dynamically changing images and sounds. But, computers are unable of making new instruction because they lack any creative abilities and intuition.

What, then, if the use of computers for the editing and publishing process, which requires both rational and creative abilities, if they lack one of the two key elements needed to solve editing problems? Systems can list and keep track of all the goals and constraints the editing solution that must be accomplished. Systems could help the journalist and a team of journalists in listing and keeping track of all the goals and constrains the editing solution must accomplish. They could group them into issues, search precedents, even propose other items or referred events or elements. The journalist and the team of journalists could use these as a basis for developing new issues for the production of their newspaper, search for precedents, even proposes other alternatives. Once a solution is found, the system could help represent it graphically or numerically and communicate it to other partners involved in the editing process.

Intelligent systems assist the journalist by their communication abilities. They connect him with a communication network, like Internet, with the members of the editing team, share information quickly and efficiently. Since the production of a newspaper is the result of joint efforts of different experts who must coordinate their own contributions, the system's abilities to enable communication between sometimes distant collaborators is as important as their contributions in support of individual journalist. Moreover, they activate tools, insure the distribution of editing information, track changes proposed by individual journalist of the editing team, and enforce access and version control.

The journalist has at his disposal many cheap tools: a tool for writing texts, for creating or adapting fixed and animated pictures, for treating sounds, etc. The editing can be done with the help of CMS, the comprehension and opinion of the readership through the blogs, wikis, tagging and social bookmarking, music-photo-video sharing, mashups, podcasts.

We hypothesize that a collaborative platform with an intuitive interface with the power of semantic web and web 3.0 can support

1) the individual journalist either access web 3.0 information on the semantic and/or base the journalist on web 3.0 data, and
2) the team to easily organize their information space (ontology-based) and share information with others.

The web 3.0 access should allow the journalist and the team to retrieve multimedia data from online repositories, like *You Tube*, *Daily Motion*. In the next chapter, we will present the methodology of our empirical study.

## 3. Methodology for the empirical study: research-action

We perform first a literature study about the journalistic practices and their evolution. Second, we analyze the websites of news agencies, news publishers, citizen journalists, civic journalists, and Network Journalists. Third, we took into account the research done on "dispersion" about the journalism in general (7, 8, 9). Fourth, we follow the discussions of professional and educational associations. Fifth, one person of the research team has acting as a journalist.

From this information we developed questionnaires for the interviews and observations in news publishers. Our approach is a constructivist one (5,6). We interviewed 31 journalists during 2 years, in France, Germany, and in the U.S.A. They were working in medium and large news publishing houses. They have a degree as a journalist and 5 years professional experiences. 21 of them were working in a traditional news publisher and 10 other produced either online-news and a traditional newspaper (10,11).

For the conception of an online-newspaper, 4 criteria are relevant: 1) the generation of solution regarding the newspaper to be produced 2) the evaluation of solutions, 3) the decision that must be taken, and 4) the communication.

The guiding model for our empirical study is based on three levels::

1) *the individual journalist* solving a problem during the production of his own.
2) Another level deals with *the interaction* between the editor and the journalist or between the journalist and the reader or between the journalist with another journalist.
3) The last level comprises *the whole production processes* of the newspaper. The use of levels allow us to structure and organize the different approach by taking into account the different research fields like, individual theories, group theories, organisational theories and societal theories.

In situ, we looked at the production of a newspaper from the point of view of journalists, media, sources, and communicators. We had a closer look at:

1) the production process and at the tasks,
2) the problems that occur in each tasks, and how the individual journalist or the team resolve them,
3) the tools that are used, and at the limitation of these tools,
4) the role of the individual journalist
5) the perception he has of his profession with the integration of the new technologies;
6) the needs for further education,
7) the organisational problems,
8) the information sources (volume, support, format, etc.),
9) the man-machine communication aspects.

In the next chapter, we will present briefly the results of our research-action.

## 4 Results of the research-action and specification of *Colline*

The main problems in the production process of a news paper are information retrieval among several multimedia information sources, the validation of the information, the meaning (semantic level), asynchronism, trust, and solidarity, knowledge extraction and their semantic annotations, their graphical representation on the interface of the collaborative environment. Despite of these elements, the interpretation and the classification of different types of possible man-machine interaction are relevant for the definition of *Colline* (10,11). The semantic web provides new opportunities for semantically-enable user interfaces. The user interface of *Colline* should be human-centred. For this reason, an understanding of journalist behaviours is very important.

A deeper inside in the actual methods of the electronic publishing allowed us to optimize the interactions and to bring new solutions to the development of *Colline*.

By the term "*collaborative*" we understand the context of work of the journalist. "*Collaborative*" means also the different level of interaction and interpersonal exchanges while the team works on a newspaper that must be edited.

"*Collaborative*" document refers to an artificial intelligence mashup. The journalist can retrieve information from different information sources like for example, a video from You Tube and take the user rating into account to select videos as collaboratively constructed semantic resources. By doing so, the journalist can chose first his information source (web service sites, blogs, news agencies), and then, the appropriate format (*RSS, XML,* etc.) to use.

From a technical point of view, the problem deals with the search for articles or information contents and of unified formats. For example, an information portal can use the *RSS* technology to display the actual information from *Reuters.fr*, then use an API to retrieve geolocalized information from *Flickr,* and finally use a *YouTube* application in Flash for the videos. The problem resides in aggregating the information sources from different technologies and encoding them in different web services specific formats (*RSS, Flash, Silverlight, XML, API*).

Journalists often use mobile devices. Searching information in large information spaces like on video repositories on mobile devices is a very tedious task because the screen is too small to display complex relationships between different media items. Despite of this, the wireless technologies are not compatible, so that journalists are not able to share and exchange their files easily directly from one mobile device to the other.

A collaborative environment for the journalist and his team must be intuitive and easy to configure. The information must be available immediately when an event occurs. The technical aspects should not slow the process.

By taking into account these statements, *Colline* gives an answer to the following questions: How can the collaborative environment support the information retrieval tasks and the collaboration among the team? How can he enhance the quality of work of the journalist and contribute to his reputation? How can we overcome the problem of the different format? How to manage the different versions of the article? How can we keep adapt the collaborative system the work practice of the news publisher (usability)? How can we introduce in a simple but dynamical way new tools (for example mobile devices) in the existing working environment of the journalist? How to combine information from the web, citizen webs, civic journalist with traditional information flow? What could be the added value of the collaborative work by speeding up the editing phase? How to treat the intellectual property (copyright, creative commons)?

## 5. Colline System: A Collaborative Intelligent Newspaper Editor

The possibility of changing communication and representation in the editing and publishing process with the aid of computing technology for Colline is grounded on six properties of computers: flexibility, interlinking, information management, intelligence, and connectivity.

These properties are illustrated by the concepts on internal and external representation. Internal representation refers to the process of ideation. The activity the journalist uses to create a draft of his article through reflection and interaction. It includes creation, evaluation, and revision of mental models, with the aid of overt conceptualization and memory aids, like writing. External representation refers to the process of communicating the evolving draft of the article to other journalists of the team in the editing and publishing process for evaluation and the production of the final version of the article.

*Colline* allows the externalization of internal representations. A model of the problem context and the editing solutions can be created in a digital form that serves to support the journalist's internal ideation process in a manner that is similar to his production process. It helps the journalist analyze the problem and manage the connections between the results of that analysis and the article draft. When the journalist is ready to share the solution with other journalists of the team and/or with the editor, (to externalize his solution) *Colline* makes it possible to transform the internal representation into an external one, using any number and variety of media that can be transmitted to the team of journalists while maintaining the connection between these external representations and the journalist's internal one. Thus, as transformations are made to the internal representations, all the corresponding external representations can be updated automatically. The internal representation can be accessed through any on of the external ones, and trough it changes made to one external representation can be communicated to all other external representations.

The *Colline* System streamlines the work of an individual journalist but also when more journalists are collaborating. It combines mobile and touch-screenbased multimodal web 3.0 interface which brings together the content from different sources and media, but will also diffuse stories along various outlets. This is done with the help of ontology-based representations. The mobile device is recognized as a semantic item on the touch-screen. By

doing this, we design centered exchange terminal of multimedia data for accessing online repositories specially dedicated for the journalists.

The journalist can retrieve the texts, pictures, sounds and videos by natural speech, for example, an AI mashup is combined with a YouTube access which is combined with a speech dialogue "Find videos featuring Pixar's movies". The journalist can retrieve the videos by taking the user ratings into account, as collaboratively constructed semantic resources. A semantic rating system can take rating into account to select videos and can proactively offer extra information to the journalist. Multimedia items from different information sources can be arranged, displayed, and manipulated on the touch-screen.

The picture below shows the collaborative intelligent Editor for Newspaper (*Colline*).


Fig 1 : Screen shot of the terminal of the collaborative environment : *Colline*

*Colline* supports the journalist can start the client applications and register several iPods on the terminal. (WLAN IP connection) to extract or to access to his personal information. The journalist places his IPod on the surface of the terminal touch-screen, *Colline* present him the data extracted from the mobile device. Each semantic object is associated to a terminal semantic interface element or exchanged between several iPods or iPhones by using ‘’drag-&-drop ‘’. The journalist has stored his personal multimedia information, which he wants to share with each other journalists of the team on their iPods or iPhones. The journalist can integrate his annotated or geolocalized data in the editing workflow and choose from the touch-screen which media could be used by the rest of the team (11).

*Wikipedia* can be used for having more background information on actual subject, to retrieve and include definitions or technical information in the article to be produced.

## 6. Architecture de *Colline*

The figure below shows the architecture and the services supported by *Colline*.

The first « part » of the system shows the different pluggable information sources or services for the data extraction. This information can be selected and moved into the newspaper frame situated in the middle of the screen by a « drag and drop » function. The different sources of

services specified for the system are the *RSS Flux* (*AFP, Reuters*) – *Flickr - YouTube – Wikipedia.*

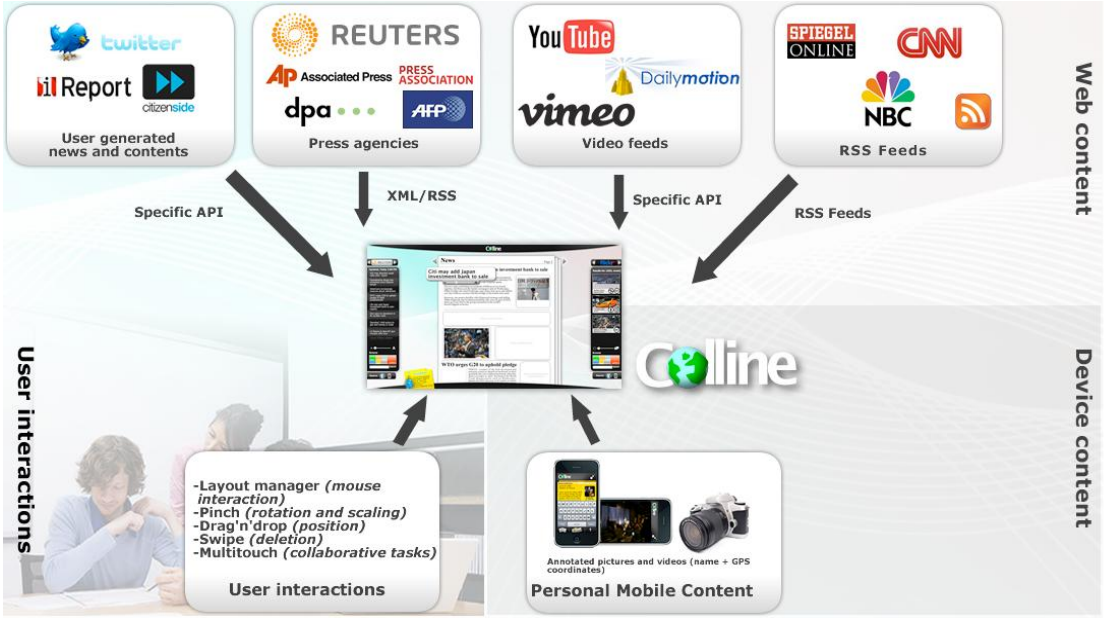


Fig.2 : Screen shot of the terminal of collaborative *Colline*

The application part allows for interlinking all the different representations and they modifications until a satisfactory solution is found which is represented in the newspaper page.

*Colline* has an information management tool that organizes, reorganizes, and accesses complex information resources and links them in ways that are most useful to the task at hand. The interaction zone defines the action behavior and serves as input or semantic drop zone. The journalist can define the way of retrieval and manipulation of the media (by gestural multi-touch).

### 6.1. Collaborative aspect of *Colline*

The results of the empirical studies and of the working practices observed at each stages of the editing and publishing process, we conclude that new interactions functionalities are required for speeding up the layout of the newspaper. At that point the « collaborative » aspect of *Colline* is relevant. A team of journalists and the editor can simultaneously work on a common working space. It makes it possible to get rapid feedback form other journalists on the newspaper draft, test the competiveness and the readability, and get more people involved in the editing process in a shorter among of time.

*Colline* allows the team of journalists to concentrate on the elaboration process and evaluation of the drafts rather than spend most of their time writing and re-rewriting it in many different ways and forms. It allows a better-informed decision making whether due to the better « see » the newspaper draft or due to the embedded intelligence in the content of the article itself.

The multi-touchscreen technology enhances the interaction between the journalists. Pictures, music, spotlets, and texts can be arranged on the surface of the touchscreen, whereas only one of in visual and discourse focus. All multimedia items from the different information sources can be arranged, displayed, and manipulated on the touchscreen. In addition, each journalist

can bring his mobile phone and after a meeting dragged the multimedia content onto his mobile device and also complete the media library of the news publishing house. The mobile semantic interface elements serve for the journalist personalization and for the handling of text, audio, and video on the mobile client.

### 6.2. Interactions with media

The right part of the terminal of Colline shows the different media (*AFP*, *Reuters*) that the journalist. The displayed pictures are annotated and classified by domains (politics, sport, technology, sciences, etc.). Filters allow to constraint the information retrieval by taken into account the user ratings into account, as collaboratively constructed semantic resources. A semantic ranking system can take the ratings into account, for example to select videos and can proactively offer extra information to the journalist.

### 6.3. Interactions and fusions with IPod touch and IPhones

The journalist can synchronize his IPod or his IPhones with the terminal *Colline*. For doing that, the journalist starts the applications and registers his IPod on the terminal (WLAN IP connection). Then he places the registered IPod on the touchscreen (implemented in *Cocoa Touch* for the IPhones and the IPod touch). Then he can extract data out of his mobile device and manipulate these data directly on the multi-touch screen.

The advantage of *Colline* is that the journalist is not constraint anymore to visualize the media on a small screen. He can extract a picture out of his mobile device and with gestural (pinch with 2 fingers, touch with 3 fingers) modify the size of the picture or modify it.

The system is not limited to pictures. Videos can also be treated. A prototype for video capturing will be developed. The journalist can create a content database with information from the web community, from the information he collected on a subject during a report, and also from the system. With *Colline*, the journalist can easily edit and publish a newspaper in an intuitive and collaborative way.

Another functionality of the mobile client server is that the journalist can take a picture and edit it later on his computer. The pictures and notes are a dematerialization of the traditional paper notes. Comments, geolocalized tags, can be added to the actual event. Updates can be received via *Twitter*. By doing this, the community aspect is enhanced.

When the journalist comes back to his office, he can synchronize his data and store his annotations in the news publishing house's data base. The content or the media can be reused, for another working session, and the data can be retrieved faster.

### 6.4. Opinions and tendencies

Currently, the production of a newspaper's content is made of a collection of news from news agencies. Colline allows the journalist to have directly access to the trends and opinions of the readership. The journalist can find information about the interest of his readership on services like qik.com or seesmic.com

### 6.5. Copyright and intellectual property

One major problem in publishing information is the intellectual property. The Creative Commons Web offers a selection of custom licenses. It allows an information producer to stipulate how their information can be used. The licenses set terms for copying and distributing digital information (music, pictures, texts, sounds) shows if the information is free or not

With *Colline*, the journalist can go to the Creative Commons Web site and search for items he might need his draft. The licenses given by the Creative Commons Web site have a machine-readable tag that allow search engines, file sharing applications. A digital rights management tools recognize the licensing item when attached to the selected information. *Colline* manage the digital rights of each retrieved information which is represented by an icon in front of each retrieved information.

## 7. Conclusion

The results of the empirical studies lead to the definition of a methodology for the online editing. The specifications of the collaborative intelligent environment for the editing of a newspaper are based on the methodology. We implemented a scenario for the journalist and a team of journalists where one application is installed on the mobile interface and a second on the touchscreen exchange terminal. Multi-touch drag and drop can be used. This enhances the interaction between the virtual world on the touchscreen and the physical IPod or IPhone. A prototype of Colline is under development at the international level. Future developments will take into account the evolution of the working practices of the journalists, of the tools, of the organizational changes in news publishers, and of work practices inherent to each country. We are testing Colline for the creation of a newspaper in communication department of local authorities.

## Bibliography


(1) Fensel, D., Hendler, J.A. Lieberman, H. Wahlster (2005). Spinning the Semantic Web. Bringing the World Wide Web to its Full Potential. MIT Press. Cambridge.

(2) Foucault, M. (1994) : *Dits et écrits.* Gallimard. Paris.

(3) Joannès, A. (2007) : *Le journalisme à l'ère électronique*. Collection Lire et Agir. Vuibert. Paris.

(4) Estienne, Y. (2007) : *Le journalisme après Internet.* L'Harmattan. Paris.

(5) Baumard, PH. (1997) : *Constructivisme et processus de la recherche : l'émergence d'une posture épistémologique chez le chercheur.* Cahiers de recherche LAREGO. Université de Versailles St Quentin, Septembre 1997.

(6) Le Moigne, J-L. (1995) : *Le constructivisme*. Tome 2. ESF. 315 p.

(7) Ringoot, R. et Utard , J.M. (2005) : *Le journalisme en invention, nouvelles pratiques nouveaux acteurs*, Presses Universitaires de Rennes, 2005

(8) Auger, D., Demers, F. & Tétu, J.-F. (2008). *Figures du journalisme, Brésil, Bretagne, France, La Réunion, Mexique, Québec*. Québec Presses de l'Université de Laval.

(9) Mert !debuzci, O. (2009). *Public Participation to the Journalism in the Information Age : Citizen Journalism.* ISIMD 2009.

(10) Ross, E., Deru, M. (2008). *Colline : Un environnement collaboratif pour la conception d'un journal.* International Conference Media 2009. 6-9 mai 2009. Athène. In print.

(11) Ross, E, Deru, M. (2009). *Un environnement collaboratif pour la conception d'un journal*. /EUTIC 2009 - Enjeux et usages des TIC - Stratégies du changement dans les systèmes et les territoires, 18-20 novembre 2009. Bordeaux. In print.