

# Murky Green: The Need for Transparency in ICTD

*Paper:* Digital Green: Participatory Video and Mediated Instruction for Agricultural Extension

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**Summary:** Digital Green is a method of producing and distributing educational videos. The two-part study that informed the original design of Digital Green shows promise as a solid piece of empirical research, but falls short of being fully transparent.

## 1. Introduction:

As computer technologies have gotten smaller and cheaper in recent years, new avenues have opened for advancing global health, education, and employment. During this same time, Information and Communication Technology for Development (ICTD) has emerged as a vibrant sub-field within Human-Computer Interaction (HCI). ICTD seeks foster development in underprivileged regions through the use of technology and often partners with NGOs and government agencies to achieve sustainable solutions.

ICTD appeared twice in our course readings this quarter, once as an example of case study [9] and once as an evaluation of research quality [1]. Kentaro Toyama was an author on both of these articles, and is well respected in the ICTD community. Toyama is also known outside of HCI. The New York Times recognized his work on Digital Green in 2008 [8].

Digital Green is a method of video production and distribution designed specifically for agricultural education. The system's genesis was described in an article published in 2009 in the Journal of Information Technology and International Development. Digital Green is still in operation and continues to be modified and studied [6]. *Digital Green: Participatory Video and Mediated Instruction for Agricultural Extension*, should represent some of the best research in ICTD given Toyama's track record, the article's publication in a prestigious ICTD journal, and the longevity of the project it describes.

## 2. Summary:

The article opens by highlighting that much of the developing world, including 60% of India, relies on agriculture for its livelihood. It follows that agricultural education should be an international priority, especially as most farmers lack formal

education and rely on their own intuition or hearsay for agricultural information. To address this lack of education, many countries have implemented agricultural extension programs in which agents travel from village to village spreading agricultural knowledge through classes and one-on-one visits.

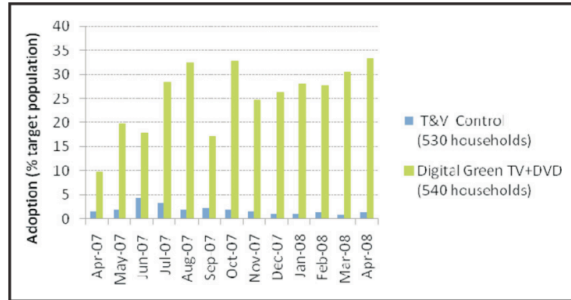
The authors sought to develop an information system that would be a cheaper and more effective alternative to current educational programs. Digital Green builds on past video-for-agriculture projects by using low cost video equipment and capitalizing on social dynamics to promote sustainable farming through video education.

Digital Green's development research was carried out in two phases. In the first phase the first author, Gandhi, conducted an ethnographic investigation by spending more than 200 days working with agricultural extension agents in Southern India. The researcher observed the agents as they trained local farmers and also tested various types of videos, video screening set-ups, and mediation techniques for their effectiveness in persuading local farmers to adopt specific farming practices.

In the second phase of research the authors tested a variation of the Digital Green video education system for 13 months. This version of Digital Green involved participatory content production of videos featuring local farmers, highly mediated video screenings, and a regimented presentation of the videos. Extension officers were recruited to help film videos, moderate their viewing, and track adoption of the presented agricultural practices. Eight villages were given the traditional agricultural extension training and eight other villages were given the Digital Green training described above. Both interventions taught the same methods in the same order. Extension agents who

mediated the Digital Green videos were paid an honorarium of up to Rs 1500 (\$30) per month on top of their normal salary and each Digital Green village invested Rs 9,500 (\$190) in a TV and DVD player. All sixteen villages were tracked for farmer-reported and mediator-observed uptake of the agricultural methods taught in the program.

The researchers found drastic differences between the adoption rates of the control group and the Digital Green group (Figure 1). Over the 13-months of the study a full 85% of farmers in the Digital Green communities adopted at least one sustainable farming method taught in the agricultural extension program whereas only 11% of farmers in the control group did likewise. Given the salaries of the extension workers, the cost of video equipment, and the difference in adoption rates, the authors estimate a drop in cost/adoption from \$38.18 using current methods to \$3.70 using the Digital Green system.



**Figure 1: Percentage of farmers in the target populations that adopted at least one new practice in a calendar month from April 2007 to April 2008.**

The authors concluded with a number of qualitative observations ranging from the need for videos featuring farmers themselves, the value of mediation in ensuring attendance to video screenings, to the positive social side effects of the videos. They claimed that the results are not conclusive due to the small sample size and geographical focus of the study. They also pledged to expand the use of Digital Green. According to the Digital Green website they have done just that, now having offices across India<sup>1</sup>.

### 3. Evaluation:

While it is encouraging that Digital Green has had some lasting impact beyond the initial study, this longevity does not imply that Digital Green was

developed using robust science. As it turns out, it is not immediately obvious how to measure the quality of the research underlying Digital Green. The two-phased Qual-Quant mixed-methods nature of the study makes it difficult to find a single set of research quality metrics, as discussed by Teddlie and Tashakkori [7]. Should the study be tested by the criteria for qualitative work described by Devers [2]? Should one focus more on Jaeger and Bond's criteria for quantitative work [5]? Should one land somewhere in between?

Thankfully the ICTD community addressed this issue in a journal article that Toyama co-authored with Jenna Burrell in 2009 [1]. The paper lays forth six principles of good ICTD research, four of which are nearly equivalent to Devers' measures of good qualitative research. This similarity evidences that Burrell and Toyama are taking established definitions of robust research and contextualizing them for use in ICTD.

**Table 1: Comparison of Criteria in Burrell and Devers**

Burrell	Devers
Accuracy	Credibility
Transparency and Soundness	Dependability
Empiricism	Confirmability
Generalizability	Transferability
Novelty	-
Relevance to ICTD	-

The remainder of this section will evaluate the Digital Green paper by Burrell and Toyama's criteria.

#### 3.1 Accuracy

Accurate research has a quality of completeness and richness which "is whether the phenomena under study is adequately described or captured in its reporting with some degree of precision" [1]. While the paper presents some concrete findings and does a better job than the Warana Unwired paper [9] at linking ethnographic investigation to system design, it still falls well short of being rich or complete.

As Dourish notes, the central contribution of ethnography is not always direct implications for practice but perspective and context [3]. The authors

<sup>1</sup> <http://digitalgreen.com>

however spend few words describing culture or general practices and instead only present insights that directly influenced system design. The authors may argue that they were not conducting ethnography but rather an “ethnographic investigation”, however the scope and length of their investigation warrant a more complete exposition of findings. The reader is left needing to trust that the authors’ descriptions are accurate and that they did not ignore deeper insights in favor of more immediately applicable ones.

Qualitative research should also take into account the authors’ biases and explain what steps were taken to mitigate them. The fact that there is no mention of bias in the entire article calls its accuracy into question. It is encouraging that researchers from Microsoft India conducted much of the field-work, but there are still many biases that may have been at play due to the researchers’ privileged status in Indian society.

Despite the shortcomings of the first phase of research, the authors present a fairly complete picture of how they defined and measured the success of Digital Green in their second phase of research. Several pages are devoted to describing the various system costs used to conduct the cost comparison between Digital Green and traditional education methods. The way in which method adoption was measured is also described, though more detail would have added clarity. Whether the lack of accuracy and precision throughout the article is due to the authors’ specific focus or due to the limit placed on the paper’s length is hard to know. In either case, the study is lacking a full description of methods and results.

### *3.2 Transparency and Soundness*

More than being accurate, research in ICTD should be transparent and sound. As Burrell and Toyama note, a graduate student should be able to repeat the study using the paper as their guide.

While the first author spent 200 days in the field studying agricultural extension and experimenting with different types of mediating technologies, a scant two pages are provided to describe this process. There is no description of how the observations were gathered or evaluated and very little explanation of how the versions of Digital Green were tested. About the only guidance given is that “the experiments were

conducted in two villages, comprising 375 households.”

In the end, even if the authors were to describe their methods at length, the journal article is simply too short to convey with any completeness the work that took place over the 20 months of the study. It may have been wise for the authors to separate their findings into several articles for this reason, but there is also a benefit to having a concise summary of the entire study.

### *3.3 Empiricism*

Good research is also backed up with evidence. Given the length of the article and the already mentioned shortcomings, the authors did a fairly good job of presenting evidence for their findings.

General claims were often backed up with specific observations and “for example” and “for instance” were common phrases throughout the paper. These observations directly informed the design of Digital Green and the authors spent three pages justifying their design decisions with evidence. One such explanation is listed below:

*Farmers seemed to perceive relevance in a particular technique presented on video, based on audio and visual cues, such as the use of the local accent. This sensitivity extended even to inanimate property: for instance, a plastic drum used in a demonstration turned away some farmers because they possessed only earthen urns.*

As already mentioned, the second phase of the study was supported by cost and adoption data. How these costs were obtained and adoption rates operationalized is not described, opening their credibility to question.

### *3.4 Generalizability*

Good research is also generalizable, or at least is accurately described so that its generalizability may be determined. The poor accuracy of at least the first phase of research strikes a hard blow against its ability to be generalized.

Furthermore, even if the entire study were accurately and completely described, it is unlikely that many of

the findings would be generalizable. Design decisions about moderation and the use of farmers in instructional videos relied heavily on power relationships in Indian society. While similar relationships may exist in other countries, care will have to be taken to generalize the study's findings and localize Digital Green to other contexts. The authors say as much in their conclusion:

*These results, however, are not conclusive due to the small size and geographic focus of the experiment, as well as our coarse evaluation of the whole DG system, which depends on a number of factors to succeed.*

### 3.5 Novelty

Interestingly, the article places related work at the end of the paper, quite possibly so the authors would be able to compare Digital Green with past work and show its novelty. Digital Green distinguishes itself by its use of low-cost video equipment, participatory video production that involves local farmers, and moderated video screening sessions.

### 3.6 Relevance to ICTD

Burrell and Toyama finally note that good ICTD research must show some impact on development. Projects that exist solely in the realm of technology may be well designed and interesting, but not relevant to ICTD. Digital Green, in seeking to improve agricultural practices, easily fits within common definitions of development.

## 4. Implication:

It may be telling that the authors describe their evaluation of Digital Green as "course". The unstructured context of Digital Green's development means that it would be hard to isolate cause and effect for any sub-component of the system. This problem seems common to most ICTD research. More broadly, it seems to plague most product development papers. Any paper that seeks to describe the development of an entire information or communication system may find the 12-15 page journal article too short a space to present a complete and accurate description of methods and design decisions.

Given these space constraints, it is hard to tell if Digital Green is an empirically supported system, or a

product of good intuition. This ambiguity makes me question whether there might be better avenues for publishing ICTD work. Conferences and journals accepting ICTD work may want to reconsider their paper length requirements and the way they might affect the quality of published research. Might there be a better way to share insights gained from designing systems in ICTD?

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