

## Virtual communities

Pierre Maret  
University of Lyon / University Jean Monnet



2

## Virtual Communities, Definition

- Also called **Online Communities**, **Web Communities**
- A network of individuals or artifacts,  
with a shared object of interest or goal,  
and using ICT-mediated communication means.

P. Maret - Virtual Communities

3

## Virtual Communities, Definition

- Comments on the definition
  - Broad definition. Covers many different applications  
→ General principles + Variations.
  - Situated in the Application layer of the OSI model, Open Systems Interconnection
- Main "components": **actors** (human, artifact), **platform** (shared environment) **with services**, **data**: **shared contents and contexts**.

P. Maret - Virtual Communities

4

## Origins, periods 1/2

- 70' → Start of Internet
  - PLATO (70): a learning system with email, chat room
  - Usenet (80): read and post messages, discussion forum
- 90' → HTML, Web browser.
  - 1993 : **browser** with **web forms** (1<sup>st</sup> : Mosaic, incl. also images).  
**User generated contents are stored**
- 2000' → Web 2.0: **user contents are published**  
**Blogs** : share + comment → social web, social networks

P. Maret - Virtual Communities

5

## Origins, periods 2/2

- From 2000
  - Intelligent Agents
  - Wooldridge: An Introduction to Multi-Agent Systems (1<sup>st</sup> edition in 2002)
  - Multi-agent platform JADE (1<sup>st</sup> version in 2000)
  - Around 2010: Semantic web + Web of things + Wearable sensors + Connectivity (= Web 3.0, unclear definition)
  - Humans & Objects interconnected + AI**

P. Maret - Virtual Communities

6

## VCS: at the crossroads of different disciplines...

- HCI Human Computer Interaction
- Multi-Agent Systems
- Social science, Psychology
- Software engineering
- Networks and communication
- Information systems, Digital documents, Knowledge management
- Connected objects, Internet of things
- Wearable sensors, Context awareness
- Persuasive systems

P. Maret - Virtual Communities

7

## Agenda

- Introduction
- Types of VCs
- Modeling the user/agents

### Other related topics

- Modeling the interactions
- Modeling the contents shared
- Services in VCs
  - Recommendations
    - Shared content edition
    - Automation (assistant)
- VC user interface
- Analyzing VCs

F. Maset - Virtual Communities

8

## Types of VCs

- Task centric VCs
- User centric VCs
- Topic centric VCs

F. Maset - Virtual Communities

9

## Types of VCs

- Task centric VCs
- User centric VCs
- Topic centric VCs

### Task centric VCs

for co-design, co-creation

Users share a same task.  
They collaborate together for a single  
(complex) result.  
Competences are brought together

#### Example:

- Collaborative document writing
- Collaborative ontology editing
- Team of players in a quest (video game)

F. Maset - Virtual Communities

10

## Types of VCs

- Task centric VCs
- User centric VCs
- Topic centric VCs

### User centric VCs

for supportive communities, persuasive communities

A single user is followed by other users  
and receives their feedback.  
What is provided? Interaction, support,  
supervision  
Concrete targets can be defined and  
followed

#### Examples

- Patient monitoring and support
- Facebook
- Twitter (partly: following a friend)

F. Maset - Virtual Communities

11

## Types of VCs

- Task centric VCs
- User centric VCs
  - Group-centric VCs
- Topic centric VCs

### Group-centric VCs

Sub-type of user centric VCs

Group of users are followed by  
other users.  
Target: group's results

#### Examples:

- Collective diet program
- A group to maintain the level of physical activity

F. Maset - Virtual Communities

12

## Types of VCs

- Task centric VCs
- User centric VCs
- Topic centric VCs

### Topic centric VCs

for information sharing

Users share a same topic of interest.  
They search and exchange on  
knowledge or experience (documents,  
data,...).

#### Examples:

- Web portal for experience sharing (medical, gardening, D.I.Y., etc.)
- Human rights monitoring system (collect data, analyze data)
- Twitter (partly: following a hashtag)

F. Maset - Virtual Communities

13

## Types of VCs

- Task centric VCs
- User centric VCs
  - Group-centric VCs
- Topic centric VCs
  - Ephemeral VCs

**Ephemeral VCs**

Sub-type of topic centric VCs

Users share a same location (or event).  
They interact on the current  
location/event.  
(Temporary technical infrastructure is  
provided)

Example:

- During a marathon (see different  
places, share with others, etc.)

F. Model - Virtual Communities

14

F. Model - Virtual Communities

15

## An abstract model

- Actor: Knowledge, Decision capabilities  $A_i(\{K_i\}, \{D_i\})$

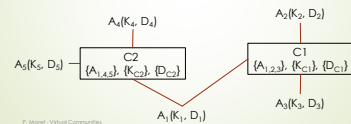


F. Model - Virtual Communities

16

## An abstract model

- Actor: Knowledge, Decision capabilities  $A_i(\{K_i\}, \{D_i\})$
- Community:  $C_j(\{A_j\}, \{K_j\}, \{D_j\})$

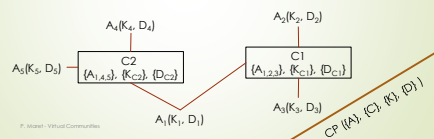


F. Model - Virtual Communities

17

## An abstract model

- Actor: Knowledge, Decision capabilities  $A_i(\{K_i\}, \{D_i\})$
- Community:  $C_j(\{A_j\}, \{K_j\}, \{D_j\})$
- Community platform:  $CP(\{A\}, \{C\}, \{K\}, \{D\})$



F. Model - Virtual Communities

18

## Comments on the model

- Actors
  - Autonomous players. Artifacts with user interaction or automated
  - Have their own individual knowledge and environment (Perception = gather knowledge from the environment)
- Community platform
  - Examples of services: registration, yellow pages (list the existing communities), backup, supervision (on content shared: illegal, or out of scope), etc.
- Knowledge: any pieces of information: document, structures and unstructured data...

F. Model - Virtual Communities

19

## Comments on the conceptual model

- Decision capabilities: abilities for actions and communications (manual or automated)
- Community
  - Contain a list of actors with possibly different roles
  - The community knowledge: Domain of interest, shared knowledge, possibly goals, roles, policy,
  - Decision capabilities: actions related to community management  
Example: policy regarding shared contents (content analysis), priority of messages, old message deletion, etc.

F. Mollat - Virtual Communities

20

## Examples of VCs


- Can you list some...?

F. Mollat - Virtual Communities

21

## Examples of VCs (w.r.t. the conceptual model)

- Facebook
  - Actors: Registered humans and bots
  - Communities: Shared messages on friend's page
  - Content: Unstructured information
  - Actions: Read, Send, Like, Invite, Accept...
  - Platform's role: store user profiles, control contents




F. Mollat - Virtual Communities

22

## Examples of VCs

- Twitter
  - Actors: Registered humans and bots
  - Unstructured information (messages)
  - Actions: Read, Send, Follow
  - Communities: people reading/writing a hashtag; people following people
  - Platform: stores profiles and contents



F. Mollat - Virtual Communities

23

## Examples of VCs

- Communities for Human rights monitoring [El Morr, 2012]
  - Actors: Registered humans such as citizens, researchers
  - K: Unstructured data: messages, images, files
  - D: Read/Send message or data, upload/download files, ...
  - Communities: different communities managed by supervisors. Shared knowledge: structured in folders, files/messages received.
  - Community of communities: List accessible

F. Mollat - Virtual Communities

24

## Examples of VCs

- Health related communities
  - Communities: people around patient, possibly managed by supervisors
  - Information based
    - Examples: losing weight together <https://www.diet.com>, caring bridge (stronger together) <https://www.caringbridge.org>
    - Shared knowledge: messages exchanged
  - Activity based [Eloumi 2016]
    - Actors: People equipped with sensors, helpers, supervisor
    - Knowledge shared: Structured data: steps, physical activity value, heart beat value, etc.; Unstructured data: messages

F. Mollat - Virtual Communities

25

## Examples of VCs : Collaborative editing

- Encyclopedia, crowd sourcing
  - Wikipedia
  - Wikidata [https://www.wikidata.org/wiki/Wikidata:Main\\_Page](https://www.wikidata.org/wiki/Wikidata:Main_Page)
    - Piscopo 2017 on the dynamics of editing
  - Enterprise memory (not publicly accessible)
- Co-design
  - Document shared editing tool (Googledoc)
  - Collaborative text translation platform
  - Collaborative ontology design platform

F. Mallet - Virtual Communities

26

## Other examples

- Collaborative **games**
- Group-based **learning**
- Distributed **system control**
  - Ex: community of sensor exchanging values and acting accordingly (comfort into a room through distributed artifacts)
- Research community**
  - The community selects contents (see Research and Innovation course)
    - No unique central platform
  - Instrumented reviewing process
    - EasyChair platform
    - Open review process: See <http://www.semantic-web-journal.net>

F. Mallet - Virtual Communities

27

## VC life cycle : phases



F. Mallet - Virtual Communities

28

## Roles in VCs

- Platform operator\*: omnipotent role
- Initiator
  - Create, Set the community parameters (topics, duration, dynamics...), Owner.
- Leader\*
  - Modify the community description (shapes the topic), delete, monitor and moderate content
  - Motivates members, glue members together
- Member
  - Read, produce, declare profile, download content
  - Different levels of expertise from novice to expert... (may lead to different rights)
- Visitor (possibly): Limited rights

\*A crucial role

F. Mallet - Virtual Communities

29

## Users and communications

- Many different possibilities
  - Operator to platform members
  - Operator to community leader
  - Leader to member
  - Leader to community
  - Member to leader
  - Member to member
  - Member to community
  - Leader/member to visitor, etc...
- 1 to 1, 1 to n
- Possibly n to 1, n to n (vote, petition)



F. Mallet - Virtual Communities

30

## Actions in the different phases



F. Mallet - Virtual Communities

31

## VC platform actions (1/3)

- **Initiation functions**
  - Set community parameters: topics, vocabulary, etc.), dynamics (protocol for recruitment, production, data analysis, etc.)
  - Create community. Ex: Group together people listening to the same music artists on a streaming platform
- **Recruitment & Profile functions**
  - Promote a community to users (platform members or external)
  - Select users as potential candidates (send invitations, or inform the leader)
  - Update user's profile (based on behavior and content)

F. Mounier - Virtual Communities

32

## VC platform actions (2/3)

- **Production and moderation functions**
  - Store contents
  - Policy enforcement
    - Detect unsupervised contents
    - Execute process engine
  - Calculations, analysis
    - Distances: user-user, user-content, content-content,
    - Contents' evolutions (see folksonomy)
  - Search engine, display contents, users' info
    - Index content
  - Promote recommended content, triggered alerts
  - Deliver reward, punishment (banish users)
  - Provide extra services: voting system, calendar management, workflow engine (reminders, incentives)

F. Mounier - Virtual Communities

33

## VC platform actions (3/3)

- **Fork function**
  - Detect sub-communities (evaluation of the need), inform actors
  - Launch community initiation function (manage information storage)
- **Sleep/Terminate**
  - Detect community inaction, manage information deletion/backup

F. Mounier - Virtual Communities

34

## What about Mobile Communities?

Transversal characteristics

- Use of **mobile** devices
  - Smart phone
  - Wearable sensors
- **Connection** during the mobility
- Emphasize the (evolving) **context** of the users: time, space, social environment. Impact on the user's profile.



F. Mounier - Virtual Communities

35

## Examples of Community platforms

- Task centered
- User centered
- Topic centered

F. Mounier - Virtual Communities