Aerobiological Information Systems and allergic respiratory disease management AIS LIFE (AIS LIFE LIFE13 ENV/IT/001107)

Second annual meeting
UPMC AND INSERM CONTRIBUTION

Paris
17-18 January 2016

UPMC/INSERM Contribution

- A1 - Set up of an Integrated Information System (IIS) in 3 countries (France, Italy, Austria)
- A2 - Set up of an enhanced Personalised Pollen Information system (PPI) in France and Italy, in combination with an in depth QOL survey
- B1 - Implementation of IIS and PPI in three countries (enrolment, randomisation, educational intervention) (1-15 m)
- B2 - Health assessment of allergy patients
- B4 Case Study France: Analysis of plant occupation of public green spaces
- D2 - Creation and continuous updating of web page for project activities
- D3 - Stakeholder Involvement Activities
- D4 - Target Audience / General Public Awareness Raising

A1 - Set up of an Integrated Information System (IIS) in 3 countries (France, Italy, Austria)

- 1-15 m
  - Pollen continuous monitoring YES (with RNSA)
  - Meteorological data YES
  - Conventional air pollutants assessment data collection YES
  - Ultrafine particulate matter (UFP) assessments
    - Protocol YES
    - P-Track assessments of UFP YES AND FINISHED (but possibility to go on to cover the delayed recruitment)

A2 - Set up of an enhanced Personalised Pollen Information system (PPI) in France and Italy, in combination with an in depth QOL survey

• Registration of active pollen traps in Italy and France in reasonable biogeographic regions in Italy and France YES

• Assignment of pollen traps to the established biogeographic regions. The list of sites located in the biogeographical regions are decied and results are checked with statistical methods (proof of similarity) YES

• Assignment of post codes to the biogeographic regions and mapping. To supply users with pollen data and forecast data post codes must be mapped into the regions YES BUT ONGOING THE CORRESPONDANCE WITH THE PATIENTS ADDRESS

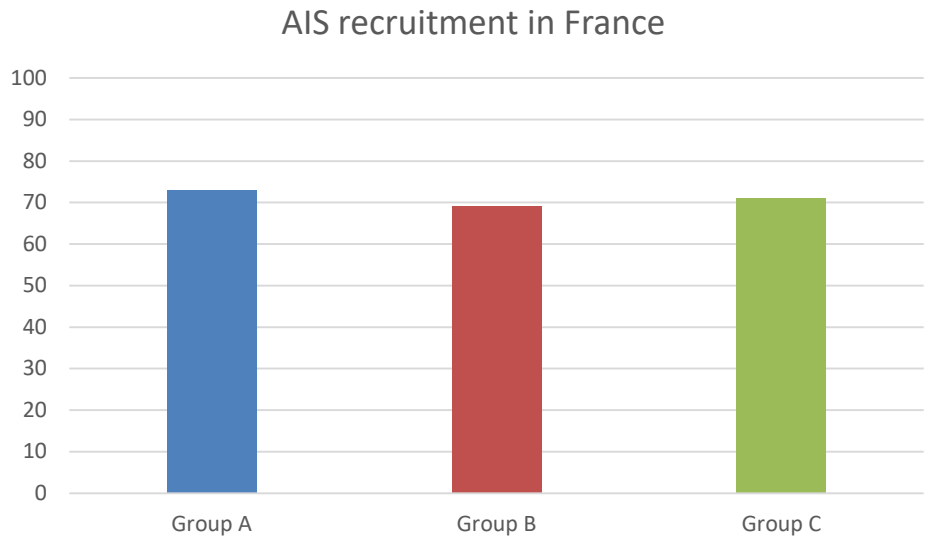
• **Translation of the PHD into the respective countries´ languages (French and Italian) YES**

• Beta test and activation of the PHD. Checking possible errors in post code mapping and forecast mapping is the first step before activating the system. For beta testing a small user group is defined with in depth application knowledge for sophisticated error reporting **YES**

B1 Implementation of IIS and PPI in three countries (enrolment, randomisation, educational intervention)

1. Selection of individuals suffering from pollen allergy (symptoms/diagnosis of allergic rhinitis or allergic asthma) living in Lyon and Paris to be confirmed

YES (see details below)



Recruitment patients selected at primary health care (PHC) level (through GPs practice) in 2016

CNIL

Ethic Com

French AR patients

Country	Italy	France	Austria
Non participants	N (%)	N (%)	N (%)
1. died	7 (2)		
2. time constraint/lack of interest	39 (10)	35 (36)	**1 (0.5)**
3. health problems	15 (4)		
4. unreachable	122 (33)		**52 (25)**
5. negative screening/moved on	168 (45)	48 (49)	**155 (75)**
6. other	22 (6)	15 (15)	
Total non participants	**373 (100)**	**98 (100)**	**207 (100)**

B2 Health assessment of Allergy Patients

- 1-15 m
  - Pollen continuous monitoring YES (with RNSA)
  - Meteorological data YES ongoing
  - Conventional air pollutants assessment data collection YES ongoing
  - Ultrafine assessments
    - P-Track assessments of UFP and PM (in France) YES

BUT TO BE REPEATED

B4 Case Study France: Analysis of plant occupation of public green spaces

RNSA leading

– Pollen count and maps YES

Need to get « operational » variables and related data be to used in the statistical analyses

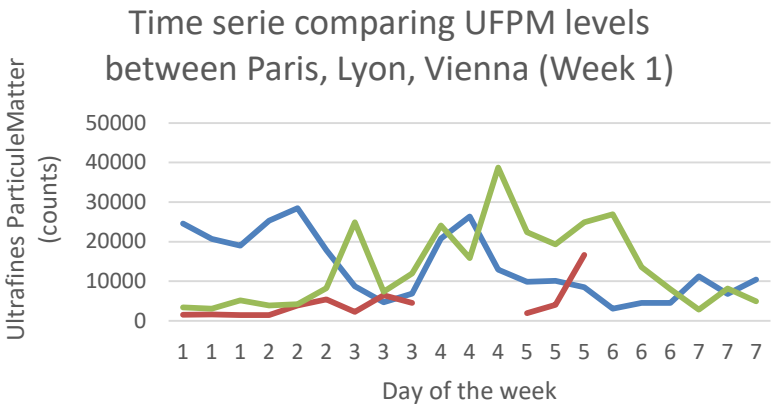
ACTIONS: Relating pollen to UFP (PM)

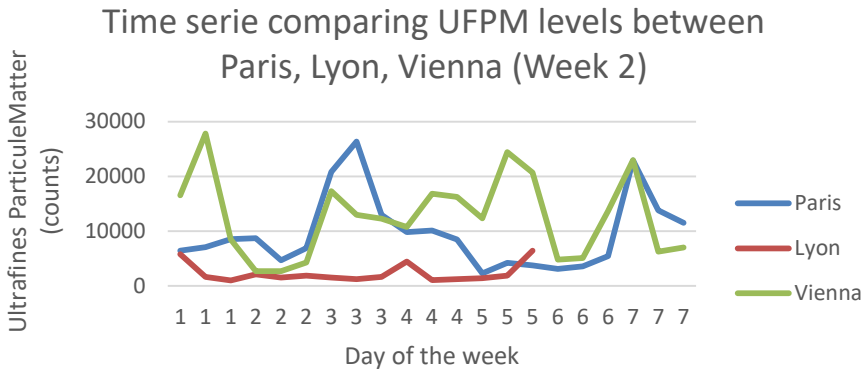
STATISTICAL ANALYSES PLAN FOR: ongoing

- Environmental data
- Description of pollen spatio-temporal distribution
- Description of UFP spatio-temporal distribution
- Health impact of pollen/air pollution
  - Relationship between pollens and UFP (PM)
  - HIA for pollens (and UFP)

France, All centers …

AIS: UFP distribution





Health Impact Assessment (HIA) of pollen/air pollution exposure

Overview

- Motivation
- What is Health Impact Association?
- HIA Parameters
- Examples

Motivation

Exposure to Air Pollution/pollens is a continual threat to public health

We can measure various levels of exposure in a given area, but how do we relate these exposures to a given health outcome in view of Public Health actions?

Understanding the health risk (mortality, morbidity, life expectancy) associated with a given concentration of a given pollutant is important in informing policy and creating air quality standards.

There are monetary costs associated with exposures or the benefits of preventative action that need to be quantified.

What is HIA?

Health Impact Assessment is an assessment of available data to understand the link between an exposure and it's impact on health (Kunzli et al.).

The goal of Health Impact Assessment is to provide an estimate of the number of health events that could be prevented (or the gain in life expectancy) from a given exposure.

What is HIA?

Health Impact Assessment DOES NOT explain the underlying mechanisms for why a given exposure is associated with a specific health outcome.

HIA uses previous epidemiological research on understanding health risks associated with exposure in order to extrapolate to the larger population.
It cannot explain WHY air pollution causes lung cancer, for example

What is HIA?

Methodology:

- Specify Exposure
- Define appropriate Health Outcomes
- Specify the exposure-response relationship
- Derive population baseline frequency measures for the health outcomes
- Calculate the number of cases

What is HIA?

Methodology: Specify Exposure

First need to determine air pollution and pollen (different scales are possible):

- Pollen
- PM_{10}
- $PM_{2.5}$
- Ozone
- NO_2

How much PM_{10} do we see in a given area over a given amount of time?

What is HIA?

Methodology: Define appropriate Health Outcomes

Which types of health events are we interested in?

- Asthma
- Allergic rhinitis
- Respiratory Hospital Admissions?

Usually, each HIA focuses on a single health outcome at a time (not always when assessing monetary costs)

What is HIA?

Methodology: Specify the exposure-response relationship

The exposure response function is the key contribution of epidemiology to HIA

The function may be reported as a slope of a regression line, or as a relative risk for a given change in exposure.

Exposure-response functions can be derived from pooled analyses or published meta-analyses

IN AIS WE WILL USE RR OBTAINED BY POISSON REGRESSION ON EXISTING DATA

What is HIA?

Methodology: Derive population baseline frequency measures for the health outcomes

We need to know:

- Total population of region
- Total number of health outcomes in region (annual)

The prevalence or incidence of a selected outcome is required from the target population

What is HIA?

Methodology: Calculate the number of cases

The impact is calculated under the assumption that the exposure causes the health outcome using

- distribution of exposure in target population
- exposure-response function
- observed baseline frequency of the health outcome in the population

Key Assumptions in HIA

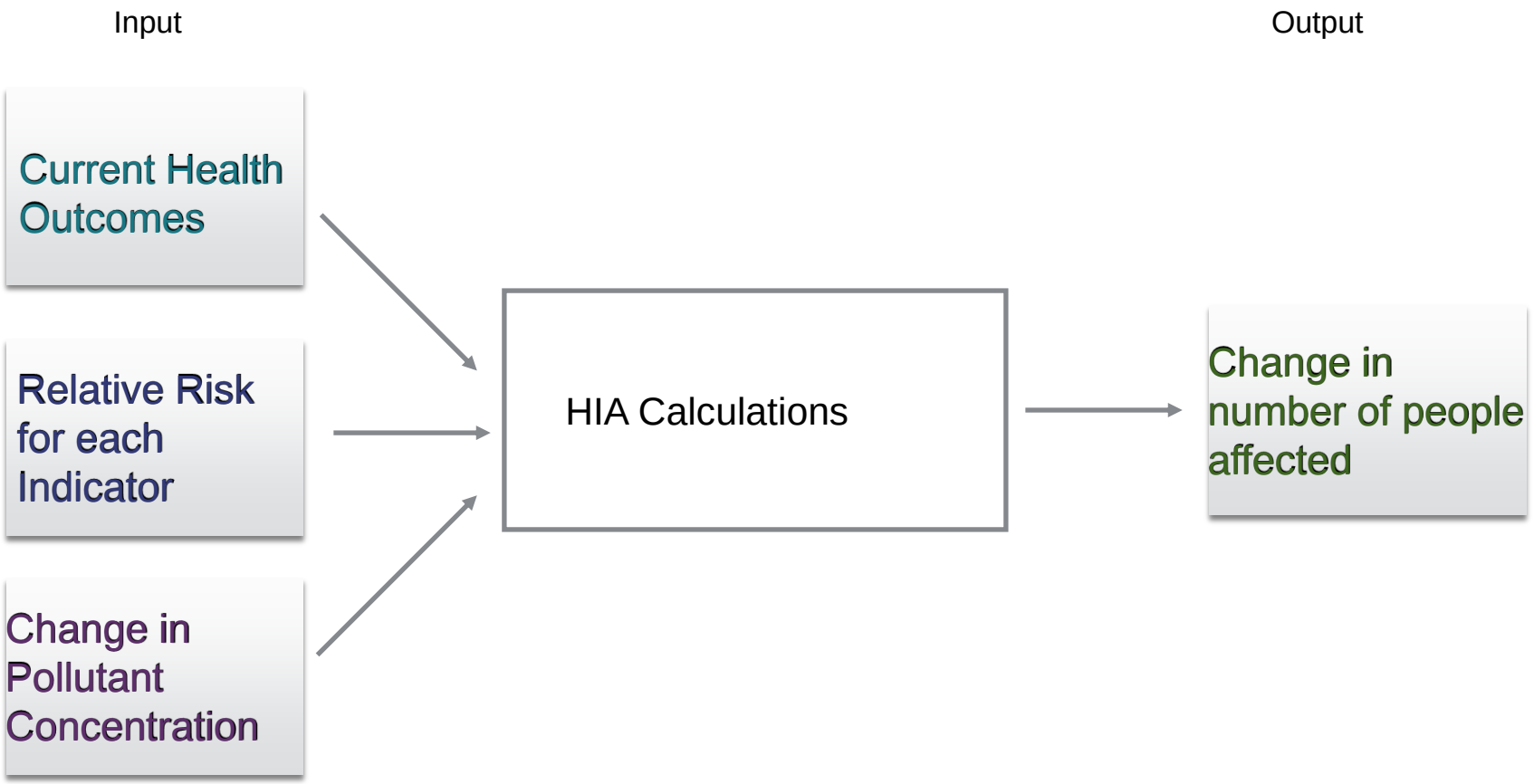
Exposure to a given pollutant/pollen is a cause of the heath outcome in question.

This assumption is contained within the exposure-response function

Population is static and movement is limited

HIA does not take into account commuting and travel, but assumes a population is always within the region of interest

Health Impact Assessment



Health Impact Assessment

$$\Delta y = y_o(1-e^{-\beta\Delta x})$$

where:

y_o = current heath outcome

Δx = change in pollutant concentration in $\mu g/m^3$

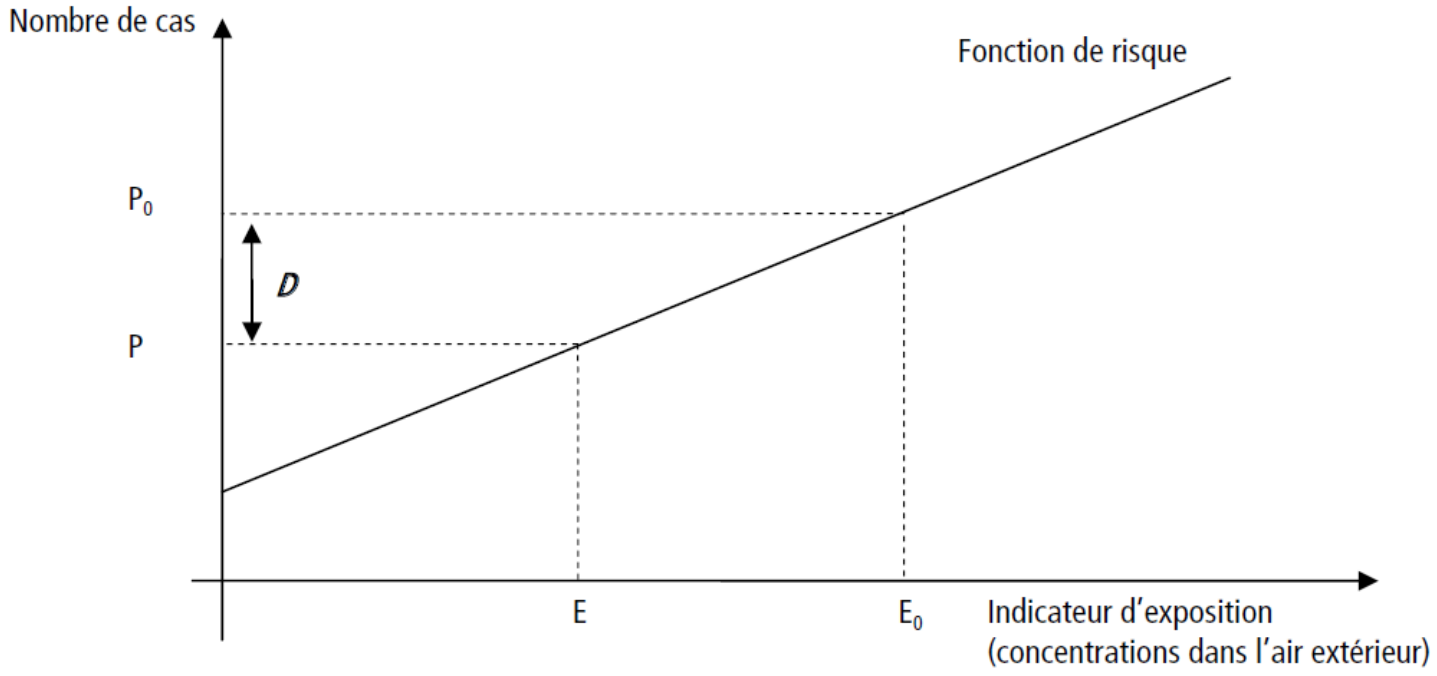
$\beta = \ln(RR)/10$

RR = relative risk/10 $\mu g/m^3$

Δy = number of health outcomes avoided

(ex: number of deaths delayed)

FIGURE 2 PRINCIPE DU CALCUL D'ÉVALUATION D'IMPACT SANITAIRE DE LA POLLUTION



La fonction de risque (relation exposition-risque, pente, risque relatif…), la fréquence dans la population de l'événement sanitaire considéré P (prévalence, incidence etc.), et l'exposition de la population E (ou la concentration) sont nécessaires pour calculer D, le nombre total de cas attribuables. Un niveau d'exposition de référence E_0 doit être défini. P_0 est la fréquence de l'évément sanitaire au niveau d'exposition E_0 (adapté de Kunzli, 2002 [77]).

How are parameters obtained?

$$\Delta y = y_o(1-e^{-\beta\Delta x})$$

y_o = how many people had this health outcome in the given time period (usually 1 year)

Δx = decrease in PM_{10} (or O_3 or…)

$\beta = \ln(RR)/10$

RR = relative risk/10 $\mu g/m^3$

} Only need one of these values

Conclusions on HIA

HIA is a useful tool in understanding the impact of exposure on the general population, both in the short and long term

Results from HIA analyses can inform policy, help set guidelines and help estimate health costs associated with various exposures

HIA can be applied any time an exposure-response function is available

HIA is applicable to many exposures and health outcomes, and can be applied to any population

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- D1. Setting of procedures for reporting results and dissemination YES
- D2 - Creation and continuous updating of web page for project activities YES AND ONGOING
- D3 - Stakeholder Involvement Activities ONGOING (RESULTS ARE NEEDED)
- D4 - Target Audience / General Public Awareness Raising
- ONGOING (RESULTS ARE NEEDED)

Dissemination activities

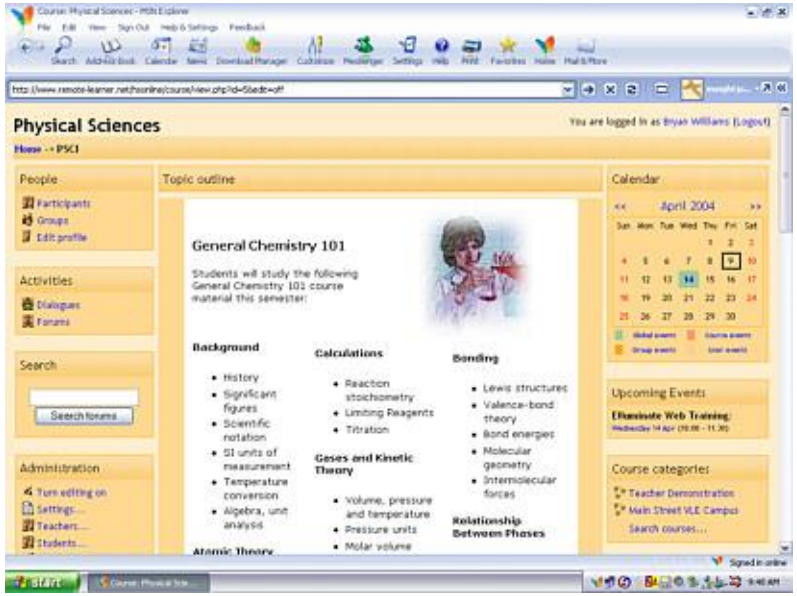
- Dissemination, Promotion and Involvment Plan (D1.1) completed
- Logo YES
- Template YES
- AIS LIFE+ diaporama of presentation YES
- Web-page www.ais-life.eu YES and updated regularly
- Social networks (Facebook, Twitter created) YES
- INTRANET YES (with PW)
- Moodle To be added (with PW also for restricted area)
- Newsletters YES 3 issues 4th forthcoming
- Several meetings/conference (posters…) organization ongoing (waiting for results)

→ EAACI meeting 2018 (proposal already submitted)
→ CFA to be submitted
→ …

Introducing..... Moodle!

Moodle is an alternative to proprietary commercial online learning solutions, and is distributed *free* under open source licensing. An organization has complete access to the source code and can make changes if needed. Moodle's modular design makes it easy to create new courses, adding content that will engage learners.

modular object-oriented dynamic learning environment



Moodle's intuitive interface makes it easy for instructors to create courses. Students require only basic browser skills to begin learning.

moodle.com

Promoting Learner Involvement

"A constructivist perspective views learners as actively engaged in making meaning, and teaching with that approach looks for what students can analyze, investigate, collaborate, share, build and generate based on what they already know, rather than what facts, skills, and processes they can parrot. Some of the tenets of constructivism in pedagogical terms include:"

- Students come to class with an established world-view, formed by years of prior experience and learning.
- Even as it evolves, a student's world-view filters all experiences and affects their interpretations of observations.
- For students to change their world-view requires work.
- Students learn from each other as well as the teacher.
- Students learn better by doing.
- Allowing and creating opportunities for all to have a voice promotes the construction of new ideas.

moodle.com

Getting Started

Moodle has a “modular” design so adding the Activities that form a course is a simple process:

1. Course creation privileges are assigned to the teacher.
2. Select from one of three course layout; **Topic**, **Weekly** or **Social** format.
3. Click “Turn editing on” within the blank course template.
4. Create the course!

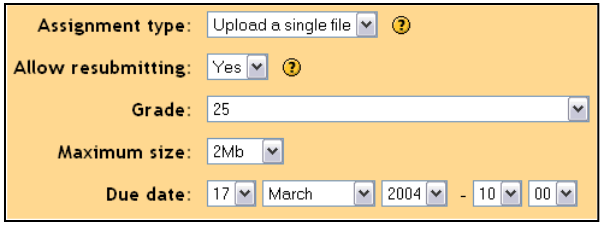
With editing turned on, the course creator can now **Add** *activities from an intuitive drop-down list of module plug-in features.*

moodle.com

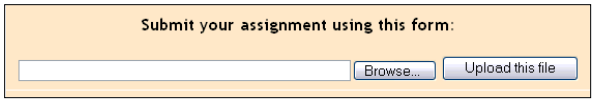
Course Management Features - Modules

Assignment

Used to assign online or offline tasks; learners can submit tasks in any file format (e.g. MS Office, PDF, image, a/v etc.).



Property screens guide instructor through setup when creating a new Assignment



Assignment activity can require the learner to upload a completed project.

Chat

Allows real-time synchronous communication by learners.

Choice

Instructors create a question and a number of choices for learners; results are posted for learners to view. Use this module to do quick surveys on subject matter.

Dialogue

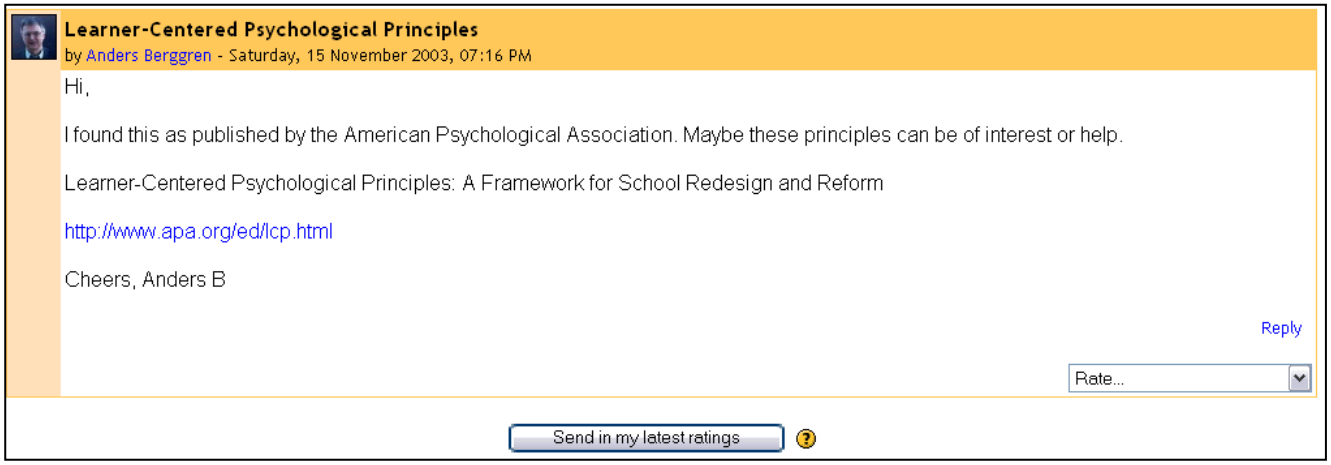
Allows for one-to-one asynchronous message exchange between instructor and learner, or learner to learner.

moodle.com

Course Management Features - Modules

Forums

Threaded discussion boards for asynchronous group exchange on shared subject matter. Participation in forums can be an integral part of the learning experience, helping students define and evolve their understanding of subject matter.



Students can Rate a forum post, based on Scales set up by the course creator

moodle.com

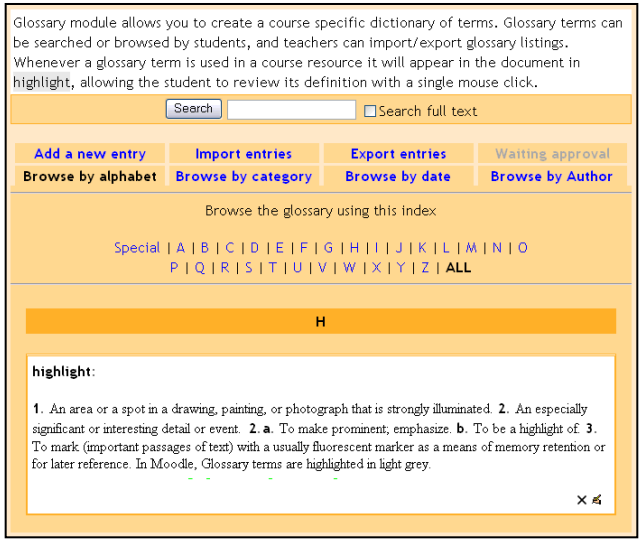
Course Management Features - Modules

Glossary
Create a glossary of terms used in a course. Has display format options including entry list, encyclopedia, FAQ, dictionary style and more.

Journal
Learners reflect, record and revise ideas.

Label
Add descriptions with images in any area of the course homepage.

Lesson
Allows instructor to create and manage a set of linked "Pages". Each page can end with a question. The student chooses one answer from a set of answers and either goes forward, backward or stays in the same place in the lesson.



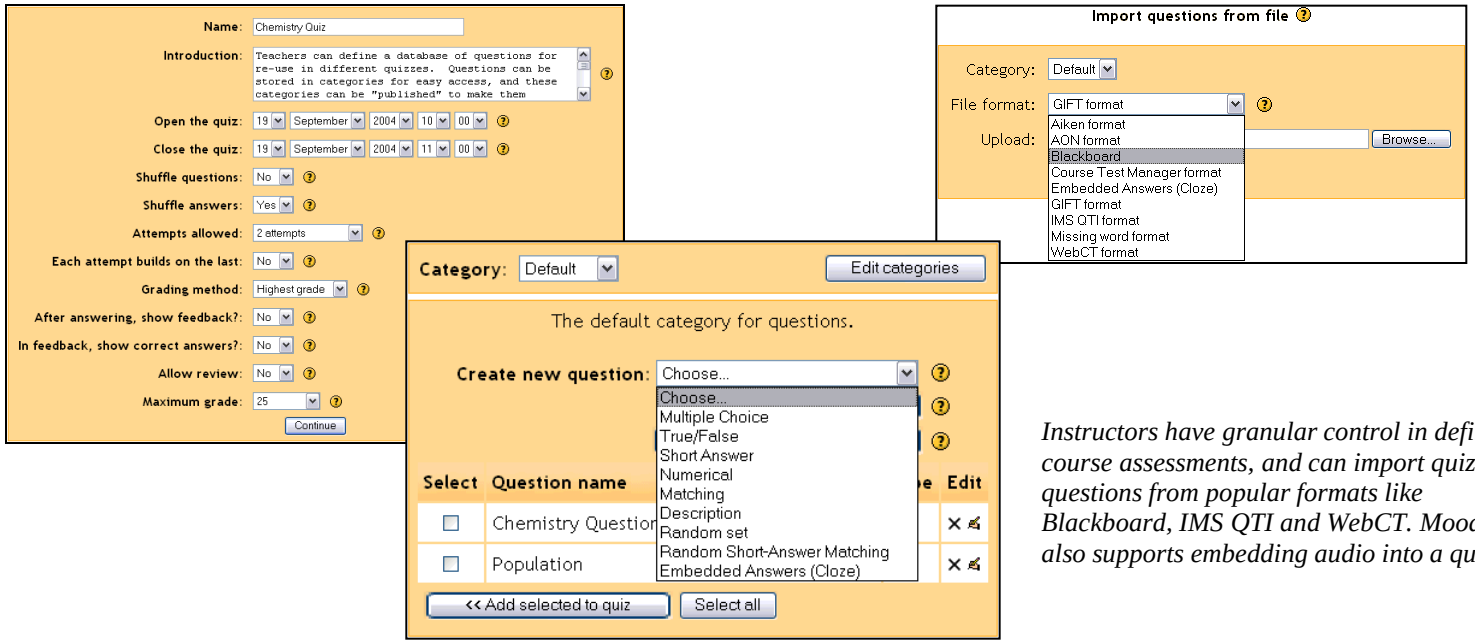
Glossary terms appear in highlight within all activity resources. Moodle includes its own site search engine.

moodle.com

Course Management Features - Modules

Quiz

Create all the familiar forms of assessment including true-false, multiple choice, short answer, matching question, random questions, numerical questions, embedded answer questions with descriptive text and graphics.

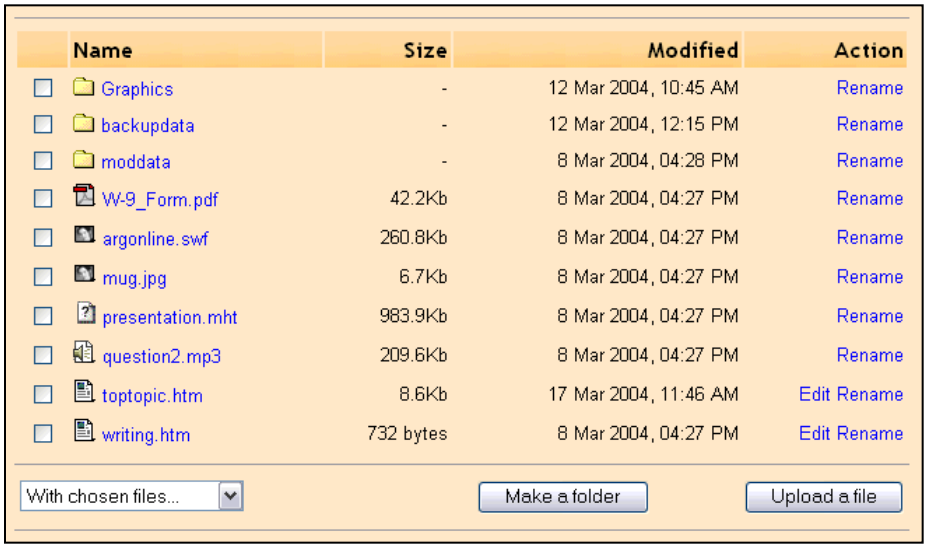


Instructors have granular control in defining course assessments, and can import quiz questions from popular formats like Blackboard, IMS QTI and WebCT. Moodle also supports embedding audio into a quiz.

moodle.com

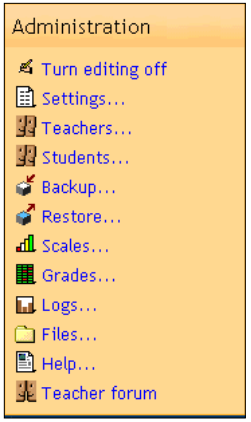
Learner Management Features - Files

Centrally locate all course resources within the Files area of Moodle so they are available when creating new activities.



	Name	Size	Modified	Action
☐	Graphics	-	12 Mar 2004, 10:45 AM	Rename
☐	backupdata	-	12 Mar 2004, 12:15 PM	Rename
☐	moddata	-	8 Mar 2004, 04:28 PM	Rename
☐	W-9_Form.pdf	42.2Kb	8 Mar 2004, 04:27 PM	Rename
☐	argonline.swf	260.8Kb	8 Mar 2004, 04:27 PM	Rename
☐	mug.jpg	6.7Kb	8 Mar 2004, 04:27 PM	Rename
☐	presentation.mht	983.9Kb	8 Mar 2004, 04:27 PM	Rename
☐	question2.mp3	209.6Kb	8 Mar 2004, 04:27 PM	Rename
☐	toptopic.htm	8.6Kb	17 Mar 2004, 11:46 AM	Edit Rename
☐	writing.htm	732 bytes	8 Mar 2004, 04:27 PM	Edit Rename

With chosen files... | Make a folder | Upload a file



Files storage area resembles your computer, making it easy to add, move, zip and delete resources.

moodle.com

Who is Using Moodle?

Over 1150 organizations in 81 countries had registered Moodle sites by April 2004 (http://moodle.org/sites). This number is growing by about 10% each month as educators and trainers learn the value of implementing open source Moodle.

Moodle is an ideal online learning solution for:

- K-12 Schools
- Colleges
- Universities
- Governmental Agencies
- Businesses
- Trade Associations
- Hospitals
- Libraries
- Employment Agencies

Dissemination activities

- Dissemination, Promotion and Involvement Plan ONGOING (but waiting for results)
  - widespread advertising campaign at national (country specific) and international (European) level after the end of the project.
  - Involvement of the interest/role of private companies in future activities

Dissemination activities

So far

To be done

- Leaflets (n=150)
- Posters (n=5)
- Brochures ((n=150)
- Technical publications To be done

- Articles (scientific, dissemination…) To be done

DISSEMINATION ACTIVITIES

ONGOING

- Increased general awareness, especially of political and health institutions → in view of Aerobiological Information Systems maintenement through a self sustainability modality.
- Needs of collaborative network/local/regional agencies in charge, will be able to guarantee a continuous flownof aerobiological /chemical/meteorological/medical data.

Dissemination activities

Previsional

To be done

- 3 Stakeholder forums: Tuscany, Vienna, Paris
- Stakeholder meeting: 1 per 6 month in each area: → 18 meetings.
- 3 Workshop/dissemination events per studied area
- A public seminar with report
- Media network with minimum 50 contacts per area

After-AIS Communication Plan

- Information on:
- Website
- Key targets
- Cooperation activities

THANK YOU