

Projet DéPHy

Développer des Pédagogies Hybrides et durables
ANR-20-NCUN-0004 DEPHY

Speaker: G. Marcou



INTRODUCTION

Objectives of DéPHy

- **Prepare the University for Hybrid Lectures**
 - ✓ Lectures that can be given at distance
 - ✓ Lectures in presence, that can use distance learning material
- **Improve the resilience of the University**
 - ✓ Against events requiring confinement
- **Improve the quality and modernization of teaching**
 - ✓ Production of new pedagogical material and tools

Situation as observed in June 2020

During confinement >60% students reported difficulties to continue their studies

- ✓ Numeric split in student's population
 - Skills, revenues, internet access
- ✓ Dropping out of students
- ✓ Lack of relevant equipment and support
- ✓ Unsuitable teaching practices for distance learning
 - Lab work, scenario, field studies

Challenges answered by DéPHy

- **Maintain student perseverance**
- **Have the means and methods of hybridization**
- **Improve students ability to learn**
- **Allow scenarios and online experiments**
 - ✓ particularly in experimental sciences
- **Support professionalization**

Overview of DéPHY



Objectives

Actions

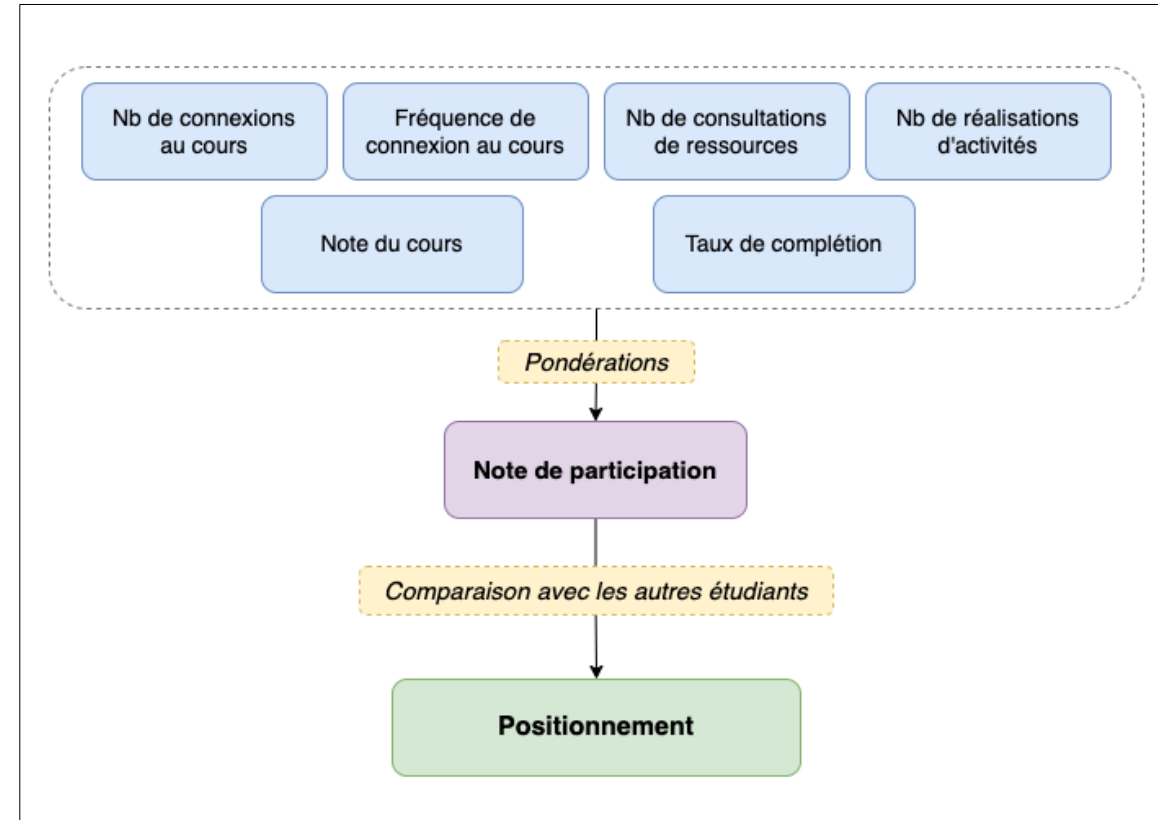
A QUICK LOOK AT DÉPHY ACTIONS

Action 1 - Supervise and support learning and student pathways

SFC & DNum – Idex EAD – Idip. Intervenant: Chef de projet SFC - Arnaud WESTERMEYER

Tableau de bord enseignant – Teacher's dashboard

- How to follow students' activities at distance?
- How to detect those that are in difficulty?
- A new dashboard for teachers
 - ✓ Measures of the students learning
 - ✓ Communication
 - Follow-up messages
 - encouragements



Determination of the learning position

Action 1 - Supervise and support learning and student pathways

SFC & DNum – Idex EAD – Idip. Intervenant: Chef de projet SFC - Arnaud WESTERMEYER

Etat d'Avancement de l'Action

May - June 22 : training the teachers

Septembre 22 : Put into production

Mes cours

Afficher

Cours dont je suis responsable

Liste de mes cours Moodle

+	Libellé du cours Moodle 1 (Libellé catégorie)	Etudiants en difficulté	Note moyenne	Taux de complétion moyen	Connexion la plus ancienne	Devoirs non rendus		
		0	15 / 20	67 %	3 jours	0		
-	Libellé du cours Moodle 2 (Libellé catégorie)	Etudiants en difficulté	Note moyenne	Taux de complétion moyen	Connexion la plus ancienne	Devoirs non rendus		
		2	9,25 / 20	21 %	2 mois	3		
	NOM	Prénom	Positionnement	Note du cours (/20)	Complétion des activités	Pas connecté depuis	Devoirs non rendus	
<input checked="" type="checkbox"/>	NORRIS	Chuck	Retard important	8	12 %	2 mois	2	
<input type="checkbox"/>	VAN DAMME	Jean-Claude		3	19 %	5 jours		
<input type="checkbox"/>	CHAN	Jackie		11	23 %	2 semaines	1	
<input checked="" type="checkbox"/>	GADOT	Gal		15	30 %	2 jours		
<input type="checkbox"/>	SCHWARZENEGGER	Arnold		-	-	-	-	
+	Libellé du cours Moodle 3 (Libellé catégorie)	Etudiants en difficulté	Note moyenne	Taux de complétion moyen	Connexion la plus ancienne	Devoirs non rendus		
		5	11 / 20	28 %	2 semaines	5		

Teacher's dashboard from a « lecture » point of view

Action 2 & 3 – Create disciplinary and transversal resources in hybridization

UOH / Idip – DNum & Composantes. Intervenante: ASI Idip - Alexia GIROUD-TROUILLET

New numerical resources: documents, recordings, animations

26 projects

77
resources

LES INTERACTIONS MEDICAMENTS / ALIMENTATION ET BOISSONS

effet de l'alimentation sur le tube digestif

Le déficit public, de quoi s'agit-il?

Amélie Barbier-Gauchard
Maître de conférences-HDR
Sciences Économiques

Des indicateurs (alternatifs) du solde complémentaire public S_t^c

solde primaire (primaire balance)

$$S_{it}^c = S_{it}^c - u_{it} \quad B_{it} = S_{it}^c + S_{it}^a$$

solde budgétaire (= cyclical - adjusted balance)

$$S_{it}^c = S_{it}^c - u_{it} = S_{it}^c + u_{it} \quad B_{it} = S_{it}^c + S_{it}^a$$

solde primaire budgétaire

$$S_{it}^c = S_{it}^c - u_{it} \quad B_{it} = S_{it}^c + S_{it}^a$$

Un échantillon est toujours un sous-ensemble de la population

Principes de Microéconomie
Capsules vidéos
Julien PENIN et Laurent BACH
BETA – Université de Strasbourg

Display of produced resources

Action 3 – Instance of a transversal resource

Idip. Intervenant: Chef de projet Idip - Morgane CAUBLOT

Learning mechanisms

- Deconstruct false beliefs
- Develop metacognitive skills



The screenshot shows a Moodle course page with a dark blue header featuring a hexagonal pattern. The main title is 'MÉCANISMES DE L'APPRENTISSAGE' with the subtitle 'MIEUX SE COMPRENDRE POUR MIEUX APPRENDRE'. Below the header, there is a breadcrumb trail: 'Accueil > Cours > Divers > En construction > Mécanismes_apprentissage'. A progress indicator shows 'Progression générale % 7'. The main content area displays five learning mechanisms as cards: 'Apprendre ?!', 'Créer des conditions favorables à nos apprentissages', 'Traiter et stocker les informations : Mémoriser efficacement, comprendre ...', 'Utiliser les ressources à sa disposition', and 'Être dans un état d'esprit favorable'. A sixth card, 'Analyser et réguler sa façon d'étudier', is partially visible below the others.

Available on aidealareussite.unistra.fr

Action 3 - Instance of a transversal resource

Idip. Intervenant: Chef de projet Idip - Morgane CAUBLOT

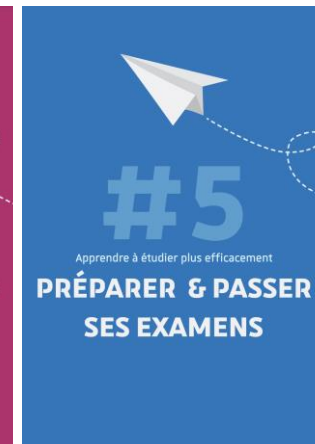
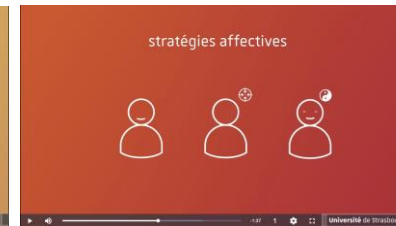
Learning mechanisms

■ Self-training

- ✓ videos, interactive chapters, quizzes, a reflective logbook

■ Educational kit for teachers

- ✓ Conference on neuromyths
- ✓ Motion design videos
 - memory, motivation, learning strategies, metacognition
- ✓ Booklets on the methodology of university work
 - online courses
- ✓ Memory Videos for Tutors



Action 7 - Support professionalization and professional integration

Idip & Espace AVENIR. Intervenante : Chef de projet Idip - Claire SPIELMANN

Focus on 

- **A complete but customizable course**
 - ✓ Self-training on Moodle AIR for
 - students, university tutors, company tutors
- **Collaboration between University departments**
 - ✓ Espace Avenir, DES, DRI, Alumni, IDIP
 - ✓ Project team and scripting of the Kit course
- **Documentary research**
 - ✓ Collection of existing resources
- **Design of the graphic charter and models**



Screen captures of the resource « BEFORE internship »

Action 7 - Support professionalization and professional integration

Idip & Espace AVENIR. Intervenant : Chef de projet Idip - Claire SPIELMANN

Cooperation between departments



	Institut de développement
et d' innovation pédagogiques IDIP	
Université de Strasbourg	

Direction
des **études** et de la **scolarité**
Université de Strasbourg

	Service relations Alumni
Université de Strasbourg	

Direction
Des **ressources humaines**
Université de Strasbourg

	Espace Avenir
Service	
orientation stage emploi	
Université de Strasbourg	

Direction	
des relations internationales	
Université de Strasbourg	



Action 8 - Support teaching teams

Idip & Composantes / Dnum / UOH. Intervenant: Chef de projet Idip - Nadira BENSMAÏA

Etat d'Avancement de l'Action

■ Asynchrone actions

✓ Moodle lecture

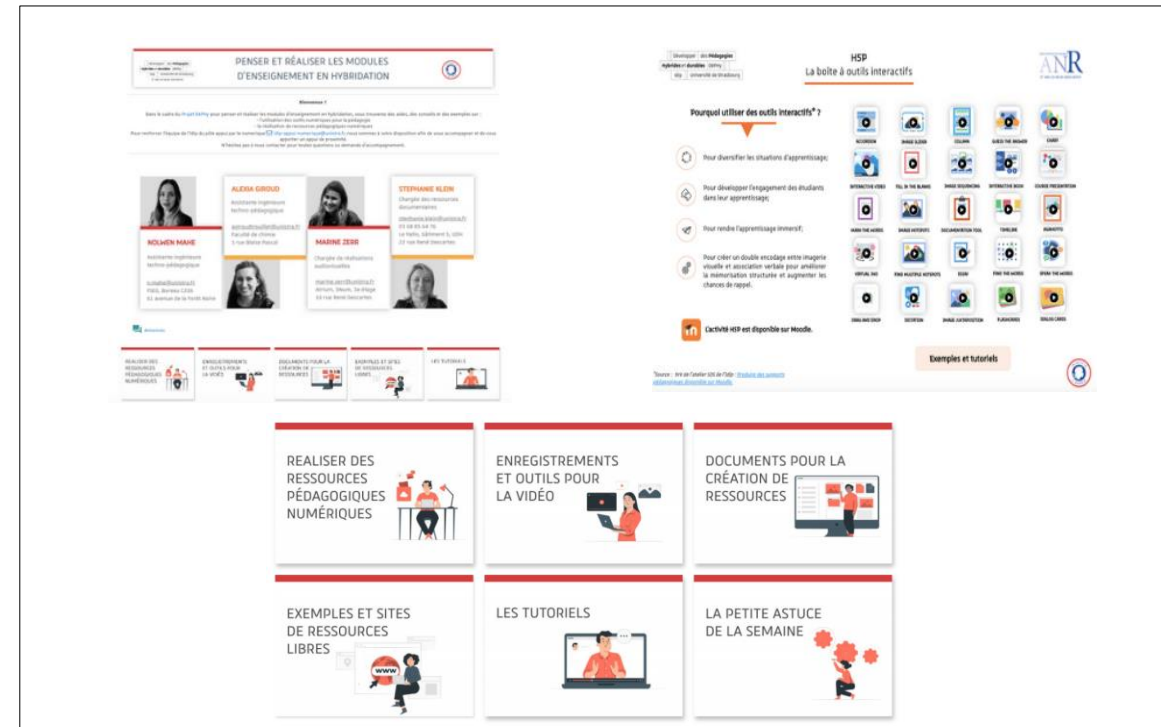
- [Penser et réaliser les modules d'enseignement en hybridation | DéPHY](#)

✓ Newsletters, tutorials

■ Synchrone actions

✓ Disponibility and contact with teachers

✓ Workshop (38 Sessions to date)



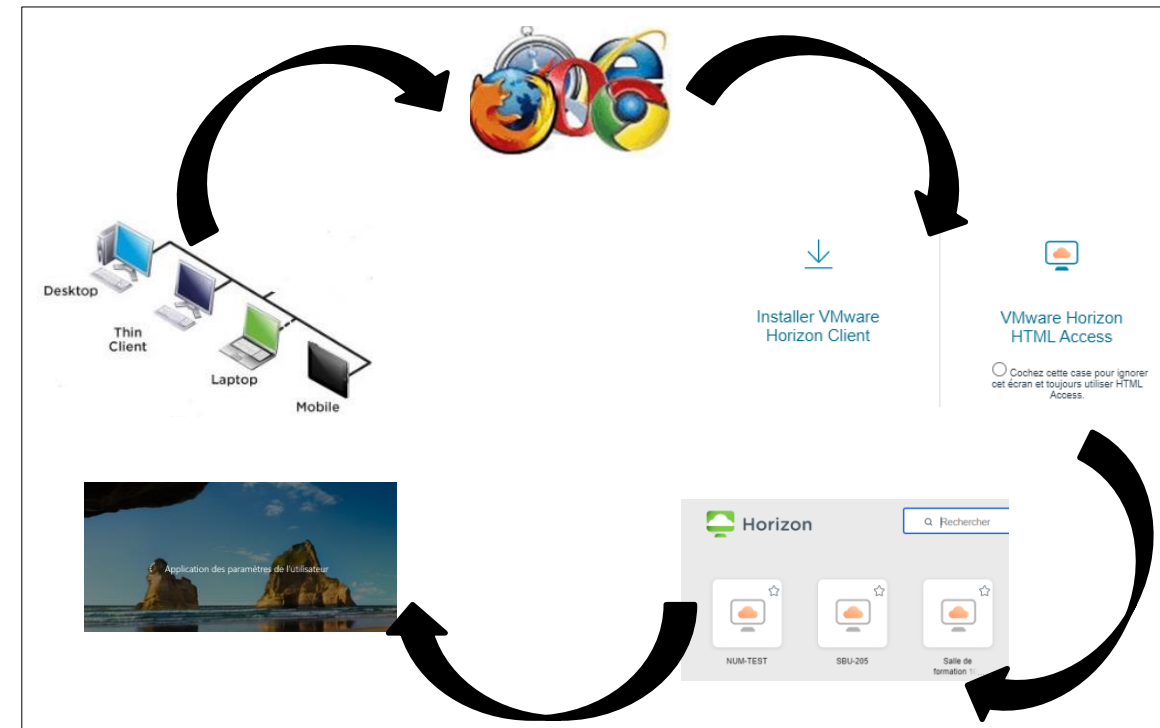
Some realizations

Action 6 – Access teaching tools via virtual machines

DNum & Facultés de physique et ingénierie, IUT Robert Schuman, Télécom Physique. Intervenant: Chef de projet DNum - Nicolas RIVAT

Focus on the Virtual Desktop Infrastructure (VDI)

- **Provide virtual desktops hosted and running on high performance servers.**
 - ✓ Virtual desktops are a copy of a traditional physical desktop.
 - ✓ VMWare's VDI technology which enables workstation virtualization
- **Setting up the "server" infrastructure**
 - ✓ Conversion to VDI of an IUTRS practical work room
 - ✓ Conversion to VDI of a Physics and Engineering lab room
 - ✓ VDI conversion of TPE Science of LIFE rooms



Schematic representation of the VDI

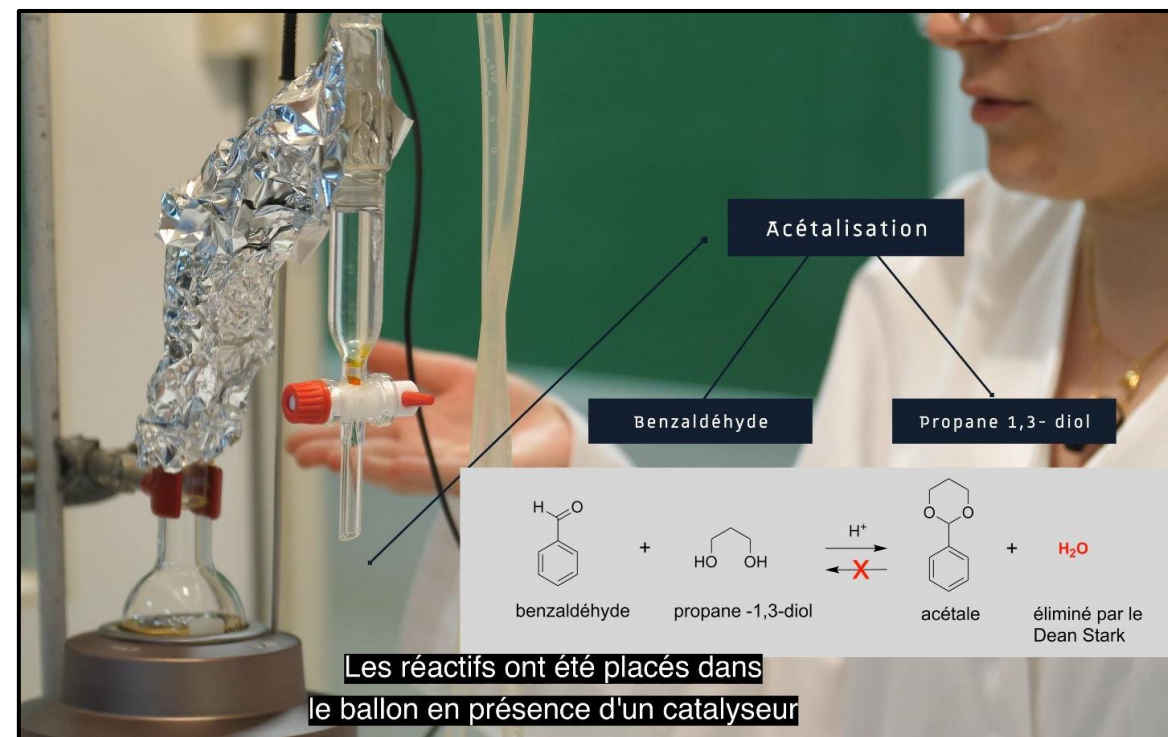
DÉPHY ACTIONS IN CHEMISTRY

Action 4 – A database of technical gestures in Chemistry

CHM – Claude BAUDER & ECPM, Faculté de Pharmacie, IUT Robert Schuman. Intervenant: Directrice Fac. CHM - Rachel SCHURHAMMER

Focus on the videos in chemistry

- Enable self-training and remediation
 - ✓ remotely and in practical work rooms
- practical skills of Bsc chemistry students
 - ✓ Production of short videos



Screen capture of the movie about Dean-Stark apparatus

Action 4 – A database of technical gestures in Chemistry

CHM – Claude BAUDER & ECPM, Faculté de Pharmacie, IUT Robert Schuman. Intervenant: Directrice Fac. CHM - Rachel SCHURHAMMER

Focus on the videos in chemistry

- Choice of relevant techniques,
- Technical production and editing of videos
 - ✓ Scripts and texts for videos
 - ✓ Post-production (comments, subtitling)
 - ✓ English translation
- Publication
 - ✓ Video platform of the University of Strasbourg



Capture du film concernant l'utilisation de l'ampoule à décanter

Action 5 - Develop the virtual practice of technical drawing in chemistry

CHM – Faculté de chimie, ECPM, Faculté de pharmacie, IUT Robert Schuman.

Intervenant: Ingénieur Chemo-informaticien CHM - Louis PLYER

Moodle plugin Molsimilarity

- Draw and self-assess drawings of chemical structures
 - ✓ A Moodle module allowing the drawing and recognition by chemoinformatics methods of the chemical structure of a compound

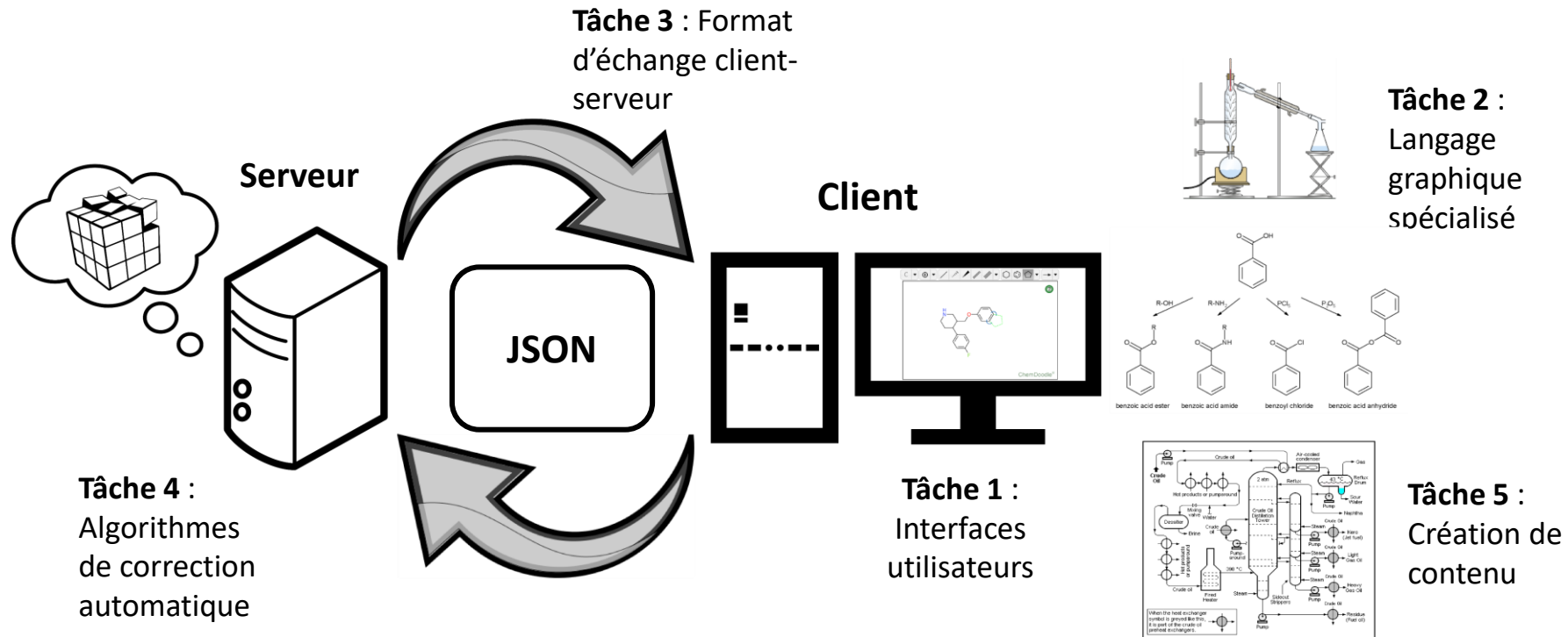
The image displays three sequential screenshots of the Moodle Molsimilarity plugin interface. The first screenshot, labeled "Drafting the question", shows a question editor with a drawing tool and a question text: "Draw the Lewis structure of the product of the addition of 1-Butene with hydrogen chloride." The second screenshot, labeled "Student's answer", shows the same question with a student's drawing of the product (2-chlorobutane) and a cartoon character. The third screenshot, labeled "Soft grading and feedback", shows the question's performance metrics: "Question 1", "Performance correct", "Note de 0,24 sur 1,00", and "0,24 / 1".

Action 5 - Develop the virtual practice of technical drawing in chemistry

CHM – Faculté de chimie, ECPM, Faculté de pharmacie, IUT Robert Schuman.

Intervenant: Ingénieur Chemo-informaticien CHM - Louis PLYER

Moodle plugin Molsimilarity – Set of tasks



- **Task 1: User interface design**
- **Task 2: Design of the graphic charter**
- **Task 3: Exchange format**
- **Task 4: Automated correction algorithm**
- **Task 5: Content creation**

Action 5 - Develop the virtual practice of technical drawing in chemistry

CHM – Faculté de chimie, ECPM, Faculté de pharmacie, IUT Robert Schuman.

Intervenant: Ingénieur Chemo-informaticien CHM - Louis PLYER

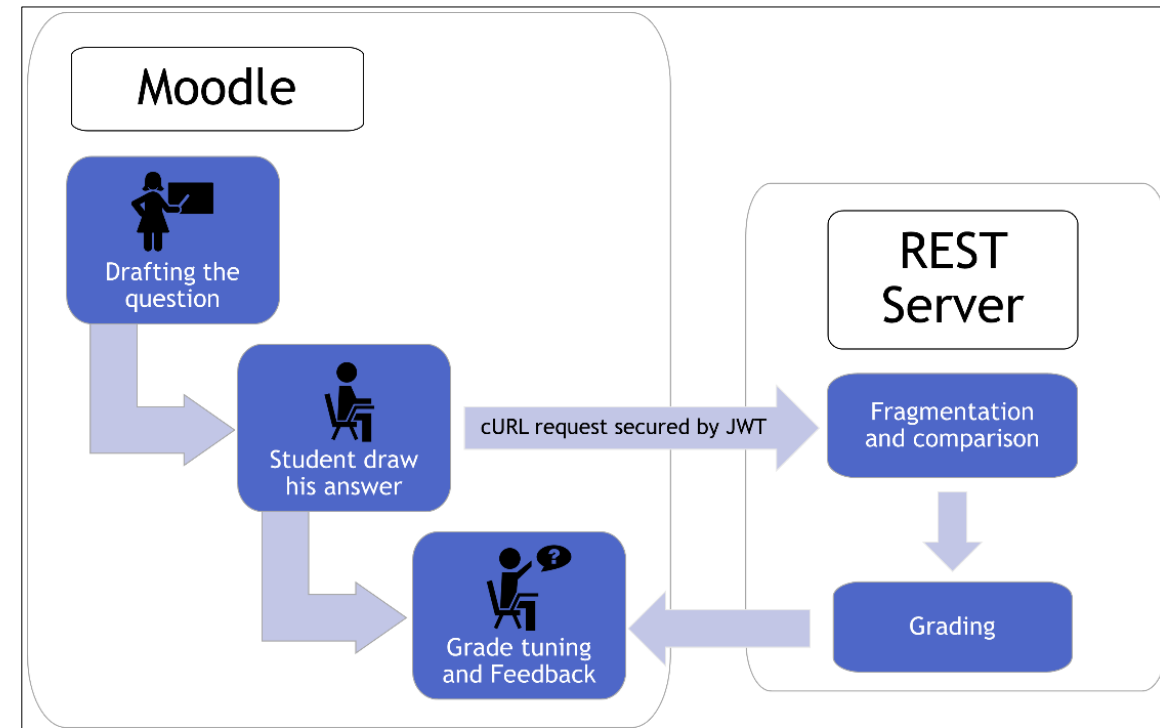
Moodle plugin Molsimilarity –

■ The module includes 3 interfaces to

- ✓ sketch a question
- ✓ sketch an answer
- ✓ Display the feedback

■ REST server

- ✓ It compares the similarity between the student's answer and the expected answer
- ✓ The Moodle server converts the similarity to a grade.



Action 5 - Develop the virtual practice of technical drawing in chemistry

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Intervenant: Ingénieur Chemo-informaticien CHM - Louis PLYER

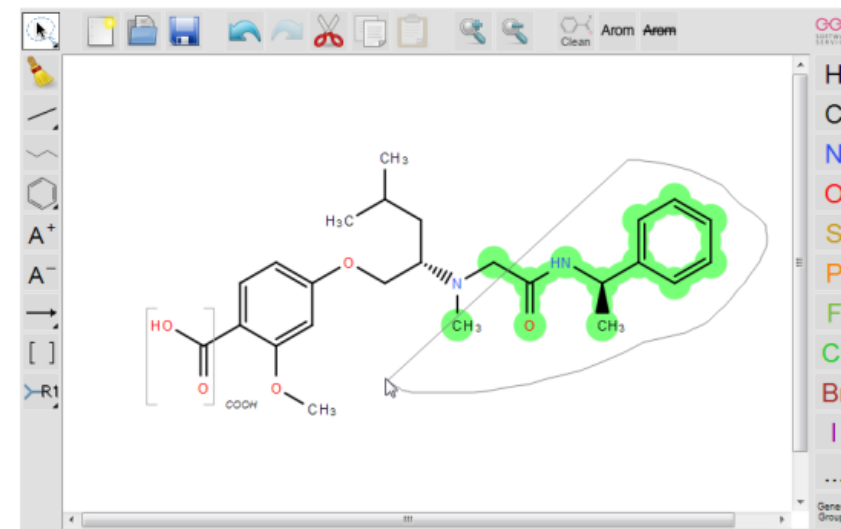
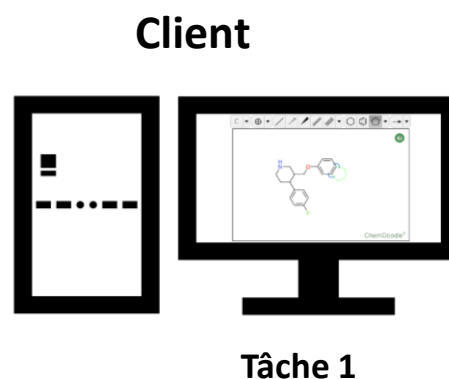
Moodle plugin Molsimilarity – Set of tasks

■ Drawing and display

- ✓ Ketcher / ChemDoodle
 - Chemical structures
 - Chemical reactions

■ Source code engineering

- ✓ Remove drawing assistance for students
- ✓ Forbid communication of the sketcher to 3rd party server



Ketcher interface

<https://lifescience.opensource.epam.com/ketcher/index.html>

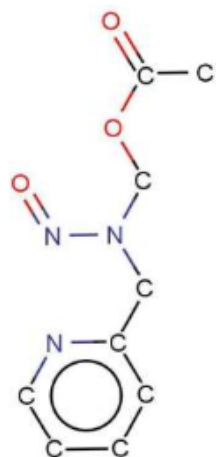
Action 5 - Develop the virtual practice of technical drawing in chemistry

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Moodle plugin Molsimilarity – Computing an answer of a signature (for a molecule)

Molecular graph



Descriptor vector

Descriptors
D ₁
D ₂
...
D _n

(1)

Molecular graph from a CML (Chemical Markup Language) input.

Signature computed by the REST server.

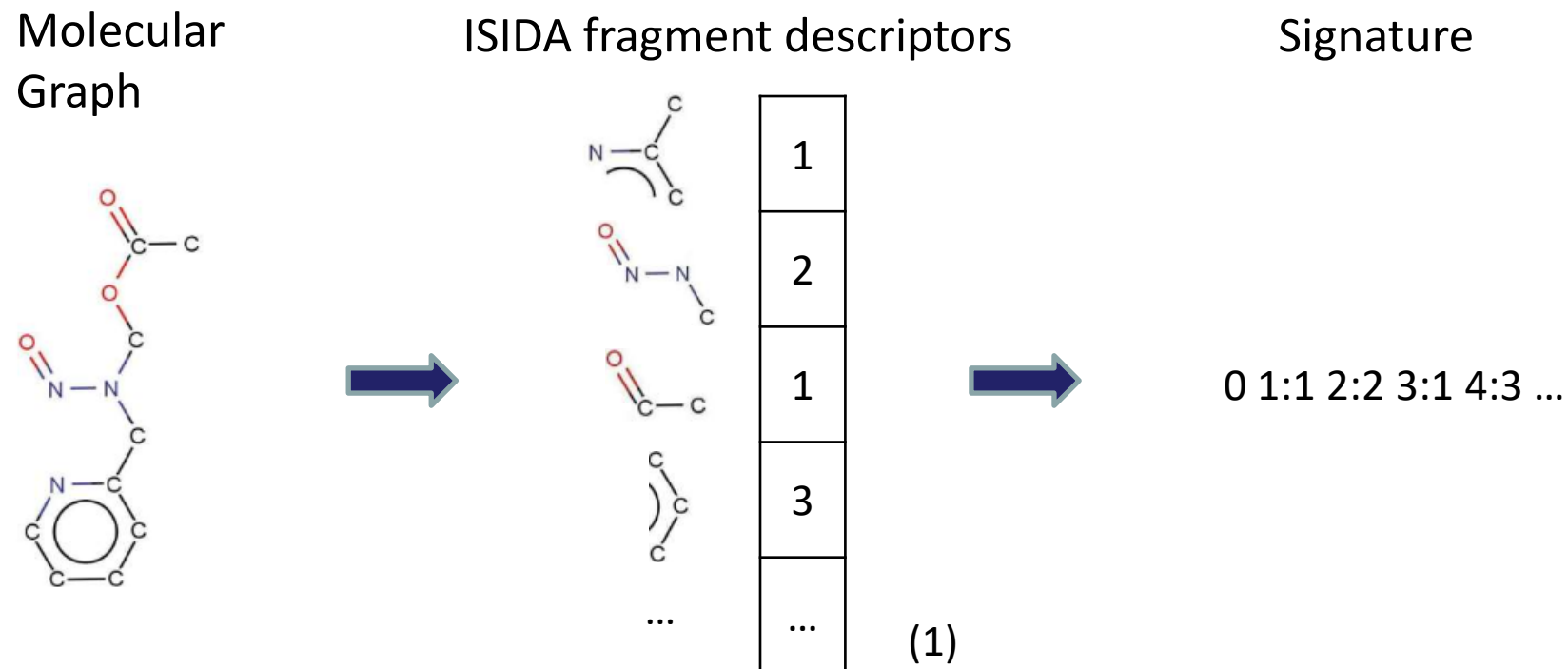
1) Varnek, A.; Fourches, D.; Hoonakker, F.; Solov'ev, V.P. Substructural fragments: an universal language to encode reactions, molecular and supramolecular structures. Journal of computer-aided molecular design 2005, 19 (9-10), 693-703.

Action 5 - Develop the virtual practice of technical drawing in chemistry

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Intervenant: Ingénieur Chemo-informaticien CHM - Louis PLYER

Moodle plugin Molsimilarity – Computing an answer of a signature (for a molecule)



The signature is the set of counts of each molecular fragments in the molecule.

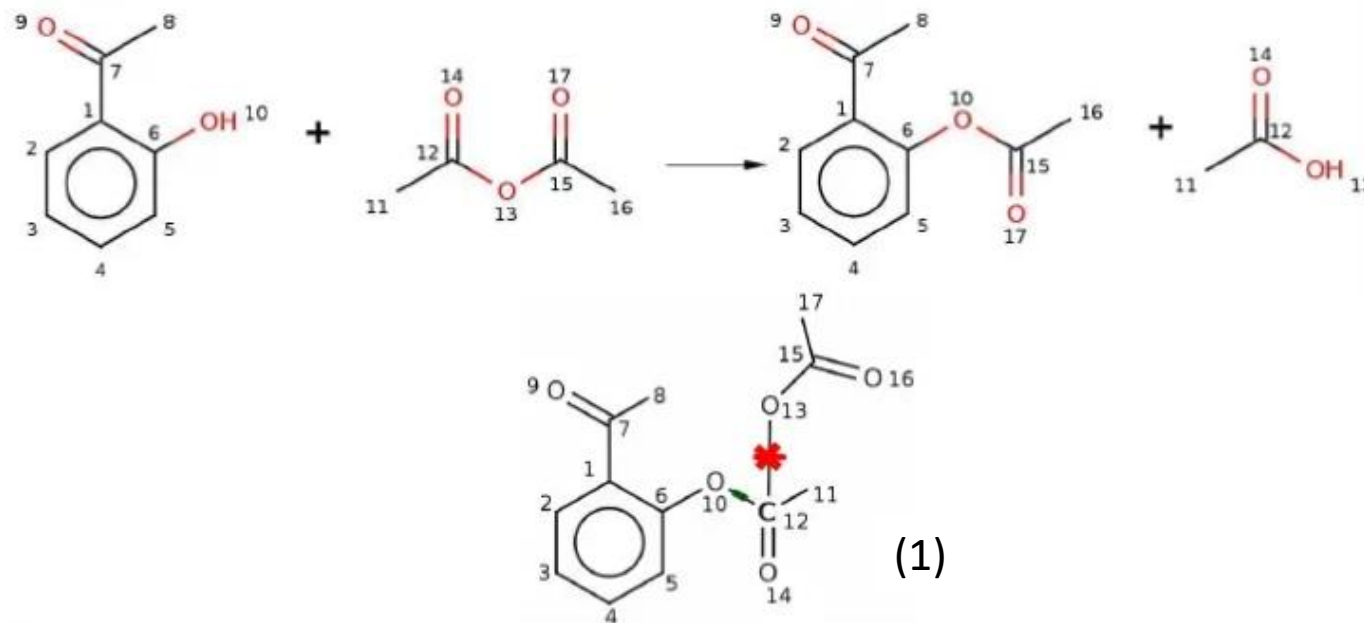
1) Ruggiu, F.; Marcou, G.; Varnek, A.; Horvath, D. ISIDA Property-Labelled Fragment Descriptors. *Molecular informatics* **2010**, 29(12), 855-868

Action 5 - Develop the virtual practice of technical drawing in chemistry

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Moodle plugin Molsimilarity – Computing an answer of a signature (for a molecule)



Atom mapping is used to generate a Condensed Graph of Reaction.

The CGR is a pseudo-molecule, including dynamic bonds and atoms representing the chemical transformation.

The signature is computed on the CGR analogously to molecules.

1) Varnek, A.; Fourches, D.; Horvath, D.; Klimchuk, O.; Gaudin, C.; Vayer, P.; Marcou, G. ISIDA-Platform for virtual screening based on fragment and pharmacophoric descriptors. *Current Computer-Aided Drug Design* **2008**, 4(3), 191.

Action 5 - Develop the virtual practice of technical drawing in chemistry

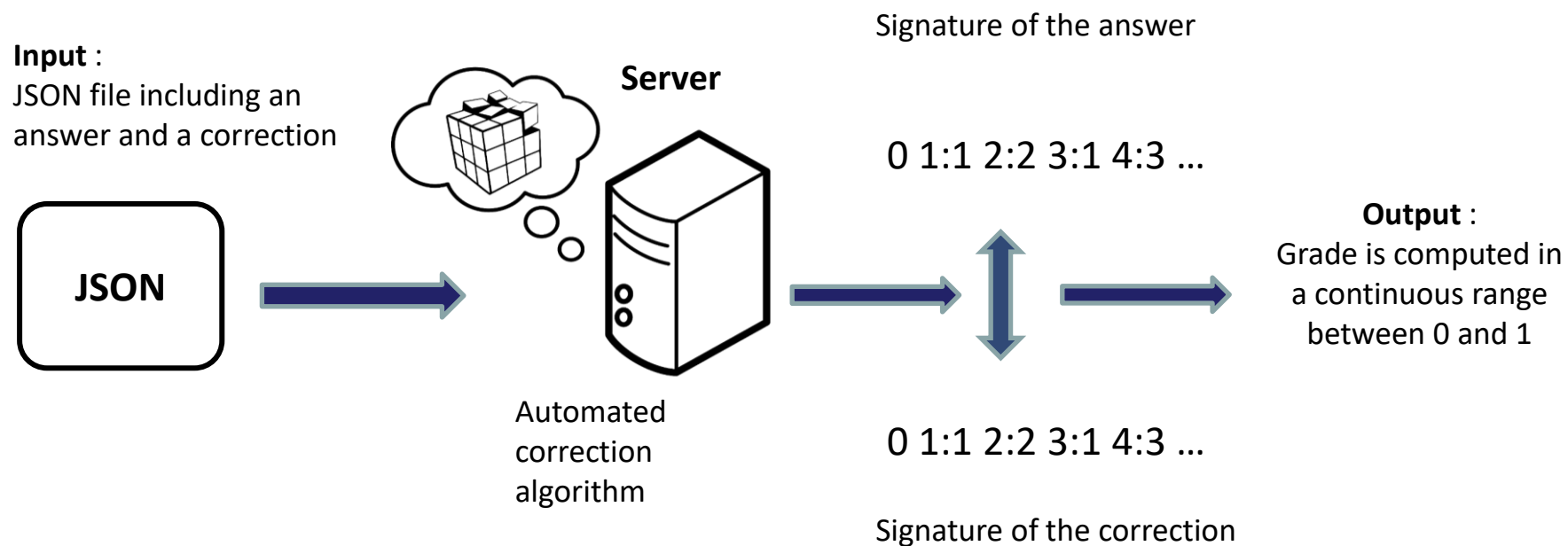
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Moodle plugin Molsimilarity – Signature comparison

Signature: an embedding of a chemical structure allowing for quantitative comparison of chemical structures.

Soft grading is based on the comparison of student's answer to expected answer



The server is based on algorithms developed in the University of Strasbourg.

Action 5 - Développer la pratique virtuelle du dessin technique en chimie

CHM –Faculté de chimie, ECPM, Faculté de pharmacie, IUT Robert Schuman. **Intervenant: Ingénieur Chemo-informaticien CHM - Louis PLYER**

Moodle plugin Molsimilarity – From similarity to grading

- Grade g_{rest} : Tanimoto similarity between the student's and teacher's structures, computed on the REST server.

- Stereochemistry analysis not requested ?

→ g_{rest} sent back to Moodle.

- Otherwise ?

$$\rightarrow g_{rest} = \begin{cases} \frac{\#Correct\ Stereo\ Center}{\#Total\ Stereo\ Center}, & \text{if similarity score} = 1 \\ 0, & \text{if similarity score} \neq 1 \end{cases}$$

- g_{rest} returned to the Moodle server, final grade g is calculated:

$$\rightarrow g = \begin{cases} (g_{rest})^\alpha, & \text{if } (g_{rest})^\alpha \geq t \\ 0, & \text{otherwise} \end{cases}$$

- t and α are user defined parameters.
- α parameter modulates teacher's exigency:
 - $\alpha < 1$ soft grading
 - $\alpha > 1$ severe grading

Action 5 - Développer la pratique virtuelle du dessin technique en chimie

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Moodle plugin Molsimilarity – Possible types of question

- **Identify the major product of a reaction.**
- **Drawing a Lewis structure.**
- **Drawing a given configuration of a molecule (R/S, E/Z)**
- **Question with multiple good answers: ex “What is the structure of glucose ?”, where the answer can be one of three structures: open, furanose and pyranose.**

Action 5 - Développer la pratique virtuelle du dessin technique en chimie

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Moodle plugin Molsimilarity – Management of stereochemistry

Stereocenters comparison using InChI: impossible if the structures (without stereo labels) are not identical.

If the similarity score is not equal to 1, a $g_{rest} = 0$ is returned to Moodle.

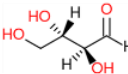
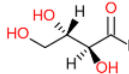
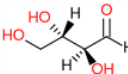
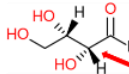
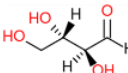
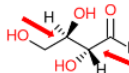
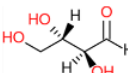
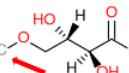
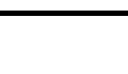
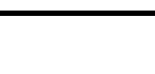
4th example: student has confused an alcohol function with an ether: the Tanimoto similarity score

student/teacher structures is 0.8.

Therefore:

→ $g_{rest} = 0$, if the stereochemistry is required

→ $g_{rest} = 0.8$ otherwise.

Teacher answer	Student answer	Similarity of stereo-omitted molecular graph	Stereochemistry used for grading ?	Grade ?
		1	Yes	1
		1	No	1
		1	Yes	0
		1	No	1
		0,8	Yes	0
			No	0,8

Action 5 - Développer la pratique virtuelle du dessin technique en chimie

CHM –Faculté de chimie, ECPM, Faculté de pharmacie, IUT Robert Schuman. Intervenant: Ingénieur Chemo-informaticien CHM - Louis PLYER

Demo plug in: Creation of the question (1)

Modification du test Journée Déphy?

Questions : 0 | Ce test est ouvert

Note maximale

Total des notes : 0,00

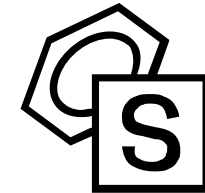
Mélanger ?

- + une question
- + de la banque de questions
- + une question aléatoire

Choisir un type de question à ajouter

-  Calculée
 -  Calculée à choix multiple
 -  Calculée simple
 -  Cloze (réponses intégrées)
 -  Glisser-déposer sur texte
 -  Glisser-déposer sur une image
 -  Marqueurs à glisser-déposer
 -  Molsimilarity
 -  Sélectionner les mots manquants
- AUTRE
-  Description

A mol similarity question type that allows the quantitative comparison between the answer given by the student and the one given by the teacher.



Action 5 - Développer la pratique virtuelle du dessin technique en chimie

CHM –Faculté de chimie, ECPM, Faculté de pharmacie, IUT Robert Schuman. Intervenant: Ingénieur Chemo-informaticien CHM - Louis PLYER

Demo plug in: Creation of the question (2)

Nom de question

Texte de la question

Note par défaut

Feedback général

Numéro d'identification

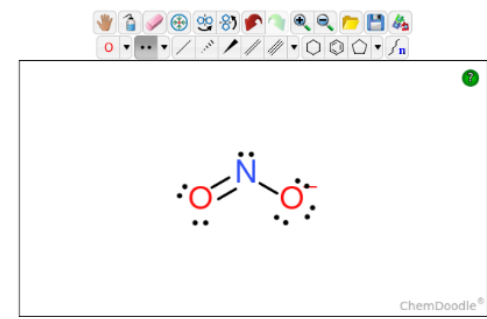
Please select a value of threshold. The answer is refused below this threshold.

Please select a value of alpha value. It will be used to modify the grade accordingly.

Option stereochemistry

Correct answers

You must provide at least one possible answer. Please draw a molecule and click on the "Insert given structure as answer/..." button for each answer.



Action 5 - Développer la pratique virtuelle du dessin technique en chimie

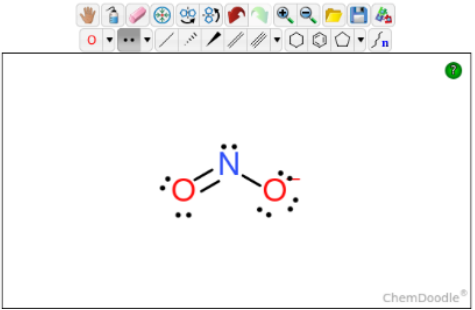
CHM –Faculté de chimie, ECPM, Faculté de pharmacie, IUT Robert Schuman. **Intervenant: Ingénieur Chemo-informaticien CHM - Louis PLYER**

Demo plug in: Creation of the question (3)

Please select a value of alpha value. It will be used to modify the grade accordingly.

Option stereochemistry

Correct answers ● You must provide at least one possible answer. Please draw a molecule and click on the "Insert given structure as answer/..." button for each answer.



Réponses

Answer: 1

Note

Feedback

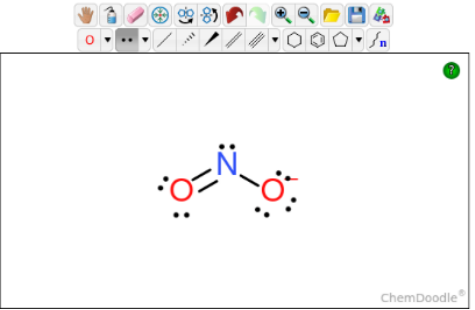
Pensez au placement des électrons de valence !



Please select a value of alpha value. It will be used to modify the grade accordingly.

Option stereochemistry

Correct answers ● You must provide at least one possible answer. Please draw a molecule and click on the "Insert given structure as answer/..." button for each answer.



Réponses

Answer: 1

Note

Feedback

Pensez au placement des électrons de valence !

Action 5 - Développer la pratique virtuelle du dessin technique en chimie

CHM –Faculté de chimie, ECPM, Faculté de pharmacie, IUT Robert Schuman. Intervenant: Ingénieur Chemo-informaticien CHM - Louis PLYER

Demo plug in: Student interface and feedback

Question 1
Réponse enregistrée
Note sur 1,00
Marquer la question
Modifier la question

Dessiner la forme de Lewis du Nitrite.

Answer:

ChemDoodle®

Question 1
Partiellement correct
Note de 0,80 sur 1,00
Marquer la question
Modifier la question

Dessiner la forme de Lewis du Nitrite.

Answer:

Pensez au placement des électrons de valence !

L'ion nitrite est la base conjuguée de l'acide nitreux. L'acide nitreux est un acide faible instable de formule HNO_2 . La formule de l'ion nitrite est NO_2^- .

The correct answer is:

Terminer le test...

Action 5 - Développer la pratique virtuelle du dessin technique en chimie

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Demo plug in: Student interface and feedback

Question 1
Réponse enregistrée
Note sur 1,00
Marquer la question
Modifier la question

Dessiner la forme de Lewis du Nitrite.

Answer:

ChemDoodle®

Terminer le test...

Question 1
Correct
Note de 1,00 sur 1,00
Marquer la question
Modifier la question

Dessiner la forme de Lewis du Nitrite.

Answer:

L'ion nitrite est la base conjuguée de l'acide nitreux L'acide nitreux est un acide faible instable de formule HNO_2 . La formule de l'ion nitrite est NO_2^- .

The correct answer is:

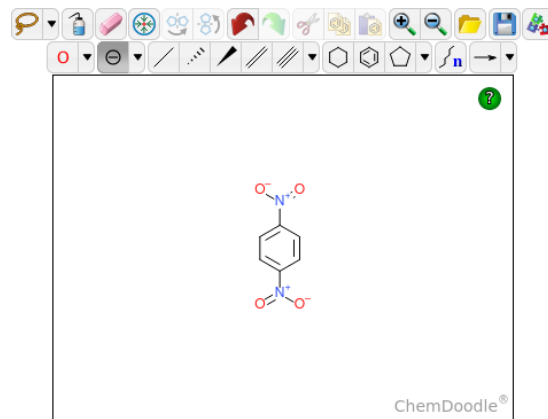
Chemical structure of Nitrite ion (NO_2^-) is shown in the drawing area.

Action 5 - Développer la pratique virtuelle du dessin technique en chimie

CHM –Faculté de chimie, ECPM, Faculté de pharmacie, IUT Robert Schuman. Intervenant: Ingénieur Chemo-informaticien CHM - Louis PLYER

Atto plugin

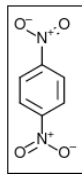
- Insert chemical drawings in any type of question, E.g. multi choice questions
- 100% free tool and open source – no license
- Plug and play – no settings on the administrator side
- Live preview of the inserted drawing size



Width (px) 65

Height (px) 145

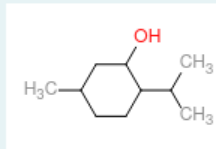
Resize image.



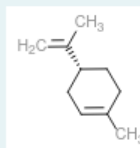
Question 1
Partially correct
Mark 0.50 out of 1.00

Which of these molecules smells like orange ?

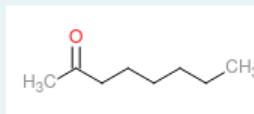
a.



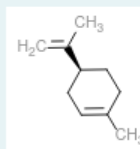
b.



c.



d.



(S)-limonène,
lemon

CONCLUSION

Conclusion and Perspectives

■ DéPHY outputs

- ✓ 8 actions that translates into publicly available tools
 - For instance Moodle/MolSimilarity and Moodle/Atto
 - Over 60 workshops
 - Sharing modules through LTI protocol with 5 universities
- ✓ Open source and open science
 - Self-evaluation (Ibou), pedagogical SOS public pages, publications on MESR web site « Je contribue » and « entraide Covid »
 - Joint project « Pratiques pédagogiques et actions pour la réussite étudiante » UHA-Unistra
- ✓ Deployment of new pedagogical tools in the University project for 2023-27
 - Access through University portal, Cél'EST, Eole
- ✓ Strategy of the University
 - Hybridation
 - Flexibilisation
 - Valorisation and indexation of resources (UOH)
- ✓ Diffusion through university alliances
 - Eucor, EPICUR, CDUS, Promosciences

Thanks

- **ACTION N° 1 | ENCADRER ET ACCOMPAGNER : SUIVI DES ACTIVITES D'APPRENTIS**
 - ✓ Chef de projet : Service de formation continue – Arnaud WESTER
- **ACTION N° 2 | PENSER ET REALISER LES MODULES D'ENSEIGNEMENT DISCIPLINAIRES EN HYBRIDATION**
 - ✓ Chef de projet : Idip, Carole Lecourt ; UOH, Carole Schorl.-Stefan
- **ACTION N° 3 | CREER DES RESSOURCES ET SCENARIOS POUR L' « APPRENDRE A APPRENDRE » EN CONTEXTE HYBRIDE**
 - ✓ Chef de projet : Idip, Morgane CAUBLLOT et Sophie KENNEL
- **ACTION N° 4 | CONSTITUER UNE BASE DE DONNEES POUR LES GESTES TECHNIQUES EN CHIMIE**
 - ✓ Chef de projet : Faculté de chimie, Rachel SCHURHAMMER
- **ACTION N° 5 | DEVELOPPER LA PRATIQUE VIRTUELLE DU DESSIN TECHNIQUE EN CHIMIE**
 - ✓ Chef de projet : Faculté de chimie, Gilles MARCOU
- **ACTION N° 6 | DONNER ACCES AUX OUTILS DE FORMATION VIA DES MACHINES VIRTUELLES (VDI)**
 - ✓ Chef de projet : Direction du numérique, Philippe HOFMANN
- **ACTION N° 7 | SOUTENIR LA PROFESSIONNALISATION ET L'INSERTION PROFESSIONNELLE**
 - ✓ Chef de projet : Idip, BELLER Emmanuelle Espace Avenir, Bernard LICKEL
- **ACTION N° 8 | ACCOMPAGNER LES EQUIPES PEDAGOGIQUES**
 - ✓ Chef de projet : Idip, Nadira Bensmaïa